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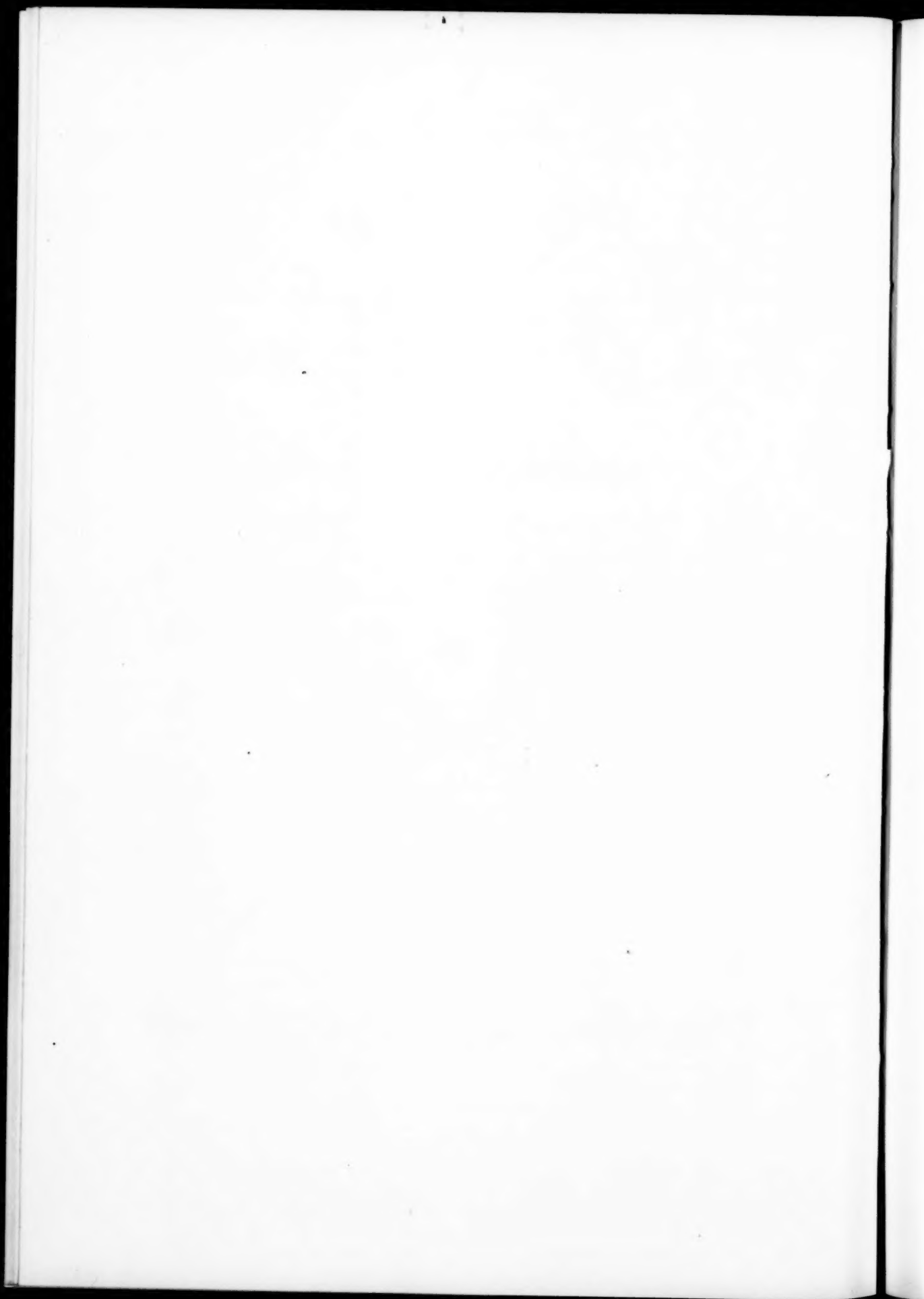
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# ARCHIVES OF PHYSICAL THERAPY, X-RAY RADIUM

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## THE HEPATIC AND CARDIAC SYNDROME\* TREATMENT BY PHYSICAL MEASURES

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ATLANTIC CITY, N. J.

The relationship of these two vital organs toward maintaining the balance of health has been recognized practically for generations by the profession. There is a particular relationship that seems to have escaped the attention of internists, but which has claimed my notice for several years.

In scanning the literature upon hepatic congestion or inflammation as associated with heart pathology, the usual presentation is that the cardiac condition is primary and the liver stasis is secondary. In some types of cases this is no doubt correct, but there are cases of cardiac hypertrophy and dilatation that are the direct result of a primary hepatic engorgement or enlargement. In many of these cases there is an associated dilatation of the arch of the aorta. So far as I am aware, this has not been recognized or recorded in medical literature except by the writer in former papers.

We recognize the liver to be the largest blood organ, and in its activities also to be one of the most important organs in the human economy. We know that it contains at least a quarter of the body's blood normally, and it, together with the splanchnic vessels, is capable

of holding all of the blood of the body. In fact some authorities state that the liver alone is so capable. Granting then that there is a marked stasis of these areas, one must assume that there will be a tremendous resistance to and obstruction of the general circulation, from which the myocardium must necessarily suffer.

Since this great organ lies at the portal of entrance of the blood from the alimentary tract into the general circulation, it is materially influenced by the digestive process. When digestion is proceeding in the usual custom three times daily, the liver becomes physiologically congested with each meal, but this being normal, is transient. When, however, there are repeated and frequent digressions from proper dietary and other regulations, the accumulated toxins irritate the hepatic cells and the result is a gradual pathologic congestion. This naturally increases with the host's repeated digressions and indiscretions until the stasis becomes pronounced and the enlargement is very apparent. Not only is the organ involved, but we have a vicious circle created in which the whole abdominal circulation is involved.

The resistance thus produced reacts against the heart and aorta, and because of the increased

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\*Submitted in Thesis Contest, American College of Physical Therapy, 1926.

effort the myocardium becomes hypertrophied as the initial stage. This is a progressive condition, but it eventually reaches the stage when it becomes regressive, and a dilatation is the result. This applies to the aorta as it becomes dilated subsequently to cardiac condition. The amount of dilatation of both will depend upon the progress of the hepatic enlargement and the patient's endurance. In the writer's knowledge there have been cases who have succumbed to some sudden stress, the acute dilatation being too great to bear.

The question naturally presents as to the correctness of this statement of relationship. There are two ways of proving the contention according to my best belief. In the first place, there have been patients who have applied for attention with hepatic stasis and some moderate enlargement, but absolutely devoid of any perceptible cardiac involvement. Such have not remained long for treatment, but have returned some months later with definite cardiac pathology and an increased liver condition. There could be no doubt as to what had occurred in the preceding months, during which there had been no treatments given. Secondly, cases that have come for treatment of the advanced syndrome, have shown marked response without attention being directed to the heart. The aortic and cardiac enlargements have subsided simply from the treatment directed to the liver alone. This has been shown by roentgenographic studies made by another physician in collaboration with the writer. It would seem logical, therefore, to deduce that the liver in these cases has played the primary role, and the results of treatment have seemed to emphasize this to the writer's satisfaction.

With this preliminary statement, the general outline of therapy will be given. While there is a general line of treatment carried out in each case, it must not be thought that such treatment can be given empirically, for there is an individuality in all cases that must be taken into consideration.

Relief of stasis is naturally the first goal sought. To secure this we have diathermy as the measure of first importance. To give this we use the 22 gauge metal electrodes, 8x10 inches for the average case, but the size is made according to the patient. The amperage is to tolerance except when there are cases of anesthesia, and this is an important matter. Generally the patient will tolerate from 1200 to 1500 milliamperes or more, and this should be given not less than a half hour, preferably longer. In applying the electrodes, one posteriorly and the other anteriorly over the abdomen including the liver area, we must make sure that the skin is thoroughly wet so that there will be a good contact. Ordinary water is the best, as a soapy water that some advise will add to the current resistance and the patient will not receive the full charge. Over the electrode as well as under the posterior one, we place an absorbent towel so that the excess of water will be taken care of and not become steam from the heat and scald the patient. This is most important and not a theoretical suggestion. The posterior electrode will be held in situ by the patient who is in a recumbent position, while the anterior may be held by the patient, or if preferred, sand or shot bags may be used. My experience favors it being held in place by the patient, as these bags add to the discomfort.

Earlier in my experience with these cases I used no other measures than those directed to the liver, but of more recent time I have become convinced that more rapid progress is had by the addition of diathermy of the heart, and now this is always used. For this purpose, smaller electrodes of the same metal are used, approximately 4x5 inches and it is absolutely essential that they be placed directly opposite, so that the current charge goes in direct line and not diagonally. The current must be started in a very gradual way, taking about five minutes to approach the full amperage, which may be from 600 to 800 ma. In discontinuing the treatment, the dosage must be reduced in the same manner,



so that with the five minutes in either direction and ten minutes at the maximum, we have altogether twenty minutes of diathermy, a sufficient time for each treatment.

The average case will do well by the above outline of treatment, but there are others that may need supplementary therapy. In some, mechanical vibration answers a good purpose for those who are conversant with its method of application. For the myocardial insufficiency which in some cases seems of immediate importance, vibration of the interspaces of the seventh cervical and first dorsal vertebrae for one and a half to two minutes, from side to side, will show its effect in a stronger pulse as well as a slower one.

In my experience many of these cases have a marked hypertension, and in suitable cases we use autocondensation for its reduction. This is

given by the use of the thick dielectric, using only from 450 to 550 milliamperes for from fifteen to twenty minutes, watching the pulse for untoward symptoms.

Granting that these measures have been faithfully applied and there has been the willing co-operation of the patient in following the advice as regards diet, exercise and rest, or other directions, we may feel quite well assured that within a month there will be shown a change for the better both in symptoms and in physical findings.

It is always a good thing to have the collaboration of a fellow physician who is skilled in roentgenography, who can check up upon one's physical findings. This has been my practice in practically all of this type of case, and by this method there can be no quibbling as to what has been found, and no biased judgement given. It is both a protection and a corroboration.

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#### **The Present State of Curie Therapy of Carcinoma. Otto Schurch. Schweiz. Med. Wsch. No. 32.**

Surgery and radiation are to be considered on equal planes in the treatment of carcinoma. There are three methods of applying radioactive substances: The natural method, the interstitial or intratumoral curietherapy, and external curietherapy.

The natural method of curietherapy consists in the insertion of radiocarriers in the esophagus, bladder, nose, vagina, rectum, etc. This method has only a certain value in the treatment of cervix carcinoma and certain tumors of the upper air passages. Intratumoral curietherapy also has only a limited importance. Surface irradiation permits of a still further development of curietherapy. The deep effect may be increased by removing the radiating mass at a distance from the skin and making use of the diffusion effect of the irradiation in the tissues. The penetrability of the radiations are thus increased. Numerous bundles of rays are also directed at the tumor through many portals. Metastases to the lymph glands are not affected by curietherapy.

Remarkable successes have been reported in skin carcinoma. Ninety per cent permanent cure has been obtained in all cases with roentgen and curietherapy. Nevocarcinoma are not in this group, however. Here

the best results are obtained with electrolysis and diathermocoagulation. Carcinomata of the uterus are influenced very favorably. In borderline cases, curietherapy is to be preferred to surgery. Of 257 tongue carcinomata, 133 were cured locally. Of these 56 died later of metastases, 77 were permanently cured. Every operable mamma carcinoma should be operated. Curie-therapy may result in the cure of inoperable carcinoma. The technique is still in a continuous flux.

Whether the application of larger masses and the development of distance irradiation will yield better results remains for the future to decide.

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#### **The Relation of Light and Cobra Poison. Much, Peemoller and Hain. Munchener Med. Wschr., Aug. 12, 1927.**

The effect of cobra poison on red blood cells can be inhibited by irradiation. This was shown in a series of experiments conducted by the authors. The irradiation also succeeded in removing the toxicity for white mice. The results of these experiments indicate that a certain and sure prophylaxis may be obtained with snake poison weakened by irradiation, to replace the uncertain serum therapy. The attenuated snake poison either alone or combined with irradiated or non-irradiated lipid may be a more effectual method against snake poison.

## THE CLINICAL VALUE OF QUARTZ LIGHT THERAPY IN CHRONIC BRONCHITIS OF CHILDREN\*

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The recognition of ultra violet light as a useful agent in treating disease has led to its widespread popularity and adoption. Because natural sunlight is not available at all times, and also for the reason that natural sunlight varies inversely with altitude, latitude, and season, various mechanical devices have been perfected for generating ultra violet light upon a large scale. There are at present relatively few hospitals without some form of mercury vapor quartz light. While it is as yet difficult to evaluate ultra violet therapy with accuracy there are many diseases in which heliotherapy is regarded as the treatment par excellence by itself. Quartz light is now considered a specific for rickets, spasmophilia, and tetany, and a useful adjunct in the treatment of secondary anemias and cervical adenitis, which improve rapidly under routine carefully regulated exposures with ultra violet.

A few of the more common skin affections for which ultra violet is of reputed value are impetigo, herpes zoster, pyodermias, and certain types of eczema. Apropos might be mentioned the use of ultra violet for chronic bronchitis in the young. At the Jefferson Hospital Quartz Light Clinic artificial heliotherapy is the treatment *per se* for most chronic coughs in children. The presentation that follows includes a report on several cases of stubborn, persistent coughs which were treated by means of the mercury vapor quartz light. The study includes children who were afflicted with simple non-tuberculous bronchitis, coughs dependent upon tuberculous

lesions in the chest, and coughs due to enlarged thymus. For obvious reasons no attempt was made to study the effect of ultra violet therapy upon those coughs secondary to foreign bodies nor those forms of bronchitis due to self limited infections, i.e. measles, pertussis, etc., and cardiac disease.

In previous studies<sup>1</sup> favorable results were reported from the use of artificial heliotherapy in children who were subjects of chronic bronchitis. Since the first paper appeared, opportunity was afforded the Quartz Light Department to continue the study with ultra violet therapy in children who had coughs for at least one month in duration. In the protocol that follows the majority of the patients treated by means of the mercury vapor quartz light were benefited to an appreciable degree so as to further justify its use as a separate and non-medicinal means for treating the condition frequently seen.

It is a frank admission by many practitioners who have been called upon to administer remedies to children of the extreme unsatisfactory results obtained through the perpetual use of drugs. The difficulty encountered in administering a nauseating dose of medicine to a child is common every day experience to most parents. Most children, if allowed to choose between a stubborn cough and the use of medicines will invariably prefer the former rather than submit to an unpleasant tasting cough mixture. Furthermore those drugs employed by the physician for chronic bronchitis, even when disguised by suitable vehicles not infrequently upset digestion, engender vomiting without an appreciable

\*From the Quartz Light Clinic, Pediatric Department, Jefferson Hospital, Philadelphia, Pa.

\*Read at the Sixth Annual Meeting of the American College of Physical Therapy, Chicago, Nov. 3, 1927.

good effect upon the bronchial symptom. Therapy of the nature indicated has been responsible for the adage sometimes overheard among patients, "the medicine is worse than the disease itself." Again, modern therapy demands few drugs of definite therapeutic action. The one-time polypharmaceutical shotgun prescriptions and panaceas are, in the present state of scientific knowledge, obsolete and unjustifiable. Patients feel privileged to interrogate physicians, and while at one time such attitude would have been regarded as unwise, if not an actual breach of ethics, it is now considered part of the physician's mission to interpret certain symptoms to patients. In other words, due to rapid strides of civilization within the last decade and a half, rationalism has replaced charlatanism, the result of which has been a closer understanding between patients and their medical advisers.

As is well known and undeniable there has been an ever increasing tendency within the past few years for the laity to drift further away from the use of drugs. This is particularly true if improvement does not follow within a comparatively reasonable time after medicines are employed. It is not the purpose of this paper to enter into a detailed account of the origin and development of heliotherapy. The few arguments advanced in the above consideration of the subject affords sufficient reason for extrinsic physical means to serve as a substitute for drug therapy.

#### VARIETIES OF BRONCHITIS TREATED BY ULTRA VIOLET

Children best adapted for artificial light therapy are those of the so-called "pre-tuberculous" group. The characteristic symptoms found among the latent tuberculous class of children were malnutrition, poor appetite, fatigue, lethargy, frequent and repeated colds, diseased tonsils and adenoids.

A second group of children included those whose weights were normal, who were continuously overactive and in contrast to the first class,

were not the subjects of focal infection. Diseased tonsils and adenoids had been removed in a large number of these individuals. Despite the apparently normal state of health there was often a history of frequent colds for which patients could offer no adequate explanation.

The third division comprised those boys and girls in whom symptoms of disease were due to the Koch bacillus. In the latter, there were present a chronic cough which was better and worse from time to time, a history of repeated colds, inability to gain weight or loss in weight, poor appetite and other symptoms characteristic of true tuberculous involvement of the lungs or hilum glands. A direct history of contact with a tuberculous father, mother, or relative was often elicited. There was also present a positive tuberculin reaction. Unmistakable signs of disease were found by physical examination of the patient which was corroborated by roentgenogram study. Hygienic dietetic care is far more important in these patients than in the first two groups and while ultra violet therapy has helped this type of patient it is not the therapy to be endorsed in preference to rest, good food and an outdoor life.

#### METHODS AND TECHNIQUE FOR QUARTZ LIGHT THERAPY

The methods employed for treating patients with quartz light are by means of: (1) generalized exposures; (2) localized exposures; and (3) a combination of the generalized and localized exposures. The latter is sometimes referred to as the combined method.

The generalized and combined exposures are most frequently used. The generalized method is particularly useful when tonic effect is desired. By means of generalized exposures local reactions (congestions) are less apt to follow. On the other hand, localized exposure must be carefully supervised, since the tube distance is much closer to the skin surface at the beginning of the treatment.

Patients irrespective of the type of treatment to be given are required to undergo a physical examination. Acute disturbances, i.e. febrile disorders, influenza, pneumonia, dermatitis, eczema rubrum, pleurisy, and acute exacerbations of chronic diseases, i.e. tuberculosis (activity), pulmonary abscesses, etc., contraindicate the use of mercury vapor quartz light. Girls in whom customary menstrual crises are about to occur should not be treated by quartz light. For similar reason treatments with the rays should be withheld during the menstrual episode. After patients are examined, directions as to the exact method of treatment are given to the clinical assistant. Initial exposures usually begin at one-half or one minute.

Members of the colored race and individuals of dark complexion can endure longer exposures of ultra violet than fair skinned patients. This is due to the coloring pigment in the derm known as melanin, which serves as a protective covering. Conjunctivitis is prevented by the use of smoked eye glasses or by covering the eyes of patients under treatment with a towel.

Exposures with ultra violet light are given upon anterior and posterior aspects of the body with the patient nude and preferably in a recumbent position. The principle of all treatment is "to educate the skin to the beams of ultra violet." There is no definite rule as to the length of exposure permitted after the skin has once been accustomed to the light. A gradual tolerance of the skin for the rays soon develops after the first half-dozen exposures. The assistant is expected to guard against burns, much in the same manner as the therapist is cautious in regard to the administration of heroic remedies, e.g. atropine or potassium iodide. In the use of the above mentioned drugs the physician will carefully avoid overdosage by being ever on the lookout for signs indicative of maximum physiologic effect. When the latter phenomenon occurs, the dose of drug is reduced or entirely withdrawn. Actinic erythema is the early sign

of maximum ultra violet effect. Exposures pushed beyond this point may result in a dermatitis or burn. A great deal of tanning is undesirable since it is commonly believed that discoloration of the skin interferes with the penetrative ability and therapeutic action of ultra violet.

At the Jefferson Hospital Quartz Light Department, initial exposures begin at one minute. In infants and some younger children at which age the skin is vulnerabl., hypersensitive and therefore easily influenced by trauma, one-half minute exposures are at first employed. The tube distance measures 36 inches at the start, and it is at this distance that the first fifteen exposures are given. Patients report for treatments on alternate days. In this manner by allowing at least one day to elapse between therapy, severe reactions are prevented and slight degrees of erythema are overcome. When after the fifteenth exposure a certain tolerance to the rays has developed, longer exposures are borne more favorably. The tube distance is then ready to be increased at closer range to the skin surface. At each subsequent treatment the tube is lowered (increased) one inch. The maximum exposure under this regime is fifteen minutes, and the closest range (contact) with the skin, one foot tube distance. The duration of this exposure (fifteen minutes) and tube distance of (one foot) is considered maximal and is continued throughout the remainder of the treatments the patient receives irrespective of number. Decided redness (erythema) with a sensation of burning and itching of the skin, severe desquamation, call for temporary or complete discontinuation of all further exposures, a reduction in the time, interval of exposures or a decrease in the tube distance. Local treatment is carried out in a manner similar to the general routine except that restricted areas of the body are treated by the rays. For this purpose small aperatures (windows) attached to the hood serve to direct varying amounts of ultra violet rays



to a definite part of the body where therapeutic effect is desired.

The combined method begins precisely as does the generalized. This is afterwards supplemented by local exposures at a tube distance of one foot for one-half the time required by the general routine.

#### INDICATIONS IN BRONCHITIS

Ultra violet therapy, natural or artificial, is particularly indicated in children with chronic bronchitis, whether simple or tuberculous. Better results can be expected from the non-tuberculous type of bronchial inflammation. The prolonged cough that commonly follows measles and whooping cough is materially improved by quartz light exposures. This does not imply that the treatment with ultra violet is in itself a specific for acute bronchitis, pertussis or measles which are necessarily self limited infections. The light is particularly useful in the child when tonic effect is desired, and during those seasons of the year when natural sunlight is not available. It is also of value in those children who during inclement weather repeatedly become afflicted with coughs and colds and who fail to respond to ordinary therapeutic measures at the physician's command. While it is not the intention of the writer to underestimate the importance of removing diseased tonsils and adenoids, and while radical measures are most certainly advocated when found necessary, it is interesting to note that in many instances such patients were enabled to overcome a harassing cough, gain weight and return to a fair state of health prior to tonsillectomy.

In both bronchial and thymic asthma dyspnea is often an outstanding symptom. Thymic asthma is remarkably well benefited by ultra violet light. This is to be expected inasmuch as ultra violet is closely related to the roentgen rays, which have been the standard treatment for enlarged thymus. The great advantage of ultra violet over the powerful x rays

is that the former is less dangerous and hence safer when handled by a less competent assistant. Ultra violet can be used with greater frequency than x rays and in larger doses without the danger occasionally experienced from roentgenogram therapy—i.e. thymic death.

The associated bronchitis of asthma is at times greatly benefited by routine therapy with quartz light. The light has no appreciable effect upon lessening the frequency nor in curtailing the attack. Under the influence of ultra violet light expectoration occurs more freely and the sense of constriction in the chest is relieved. These results are in all probability brought about by a counter irritant effect.

Dunham<sup>2</sup> reported the results of treatment of thirty-three cases of infantile asthma with ultra violet rays. Complete cure occurred in seventeen cases, which, previous to exposure with ultra violet, appeared hopeless. Six of his series improved, and four were definitely benefited, while in four no change was observed. In two patients the treatment had to be terminated prematurely owing to a return of symptoms.

#### CONTRAINDICATIONS

Natural and artificial sunburn of first and second degree are made much worse by quartz light exposures. Burns from quartz light are known as chemic burns in contrast to those injuries inflicted by heated surfaces (physical burns). The latter injuries heal rapidly when treated by carefully regulated doses of ultra violet. Burns from quartz light call for a discontinuation of all further exposures and the use of antiseptic or astringents in ointment, i.e. tannic acid, zinc oxide or bismuth. Of these a two per cent tannic ointment answers the requirements best. Acute congestion of organs contraindicate the use of mercury vapor quartz light. Active tuberculous and pneumonic lesions are made worse by quartz light exposures. The acute congestion already present in the inflamed organ when treated by ultra violet is

| Case  | Age     | Sex | Diagnosis                      | Duration               | Method of Treatment   | No. Expt. Wkly. | Wt. Begin'g Treatment | Wt. After Treatment | Results  |
|-------|---------|-----|--------------------------------|------------------------|-----------------------|-----------------|-----------------------|---------------------|--|
| A. Z. | 6½ mos. | F.  | Chr. Bronchitis                | 8 mos.                 | Generalized           | 8               | 41½ lbs.              | 41 lbs.             | Cough disappeared. Improved.                           |
| H. Z. | 8 yrs.  | F.  | Chr. Bronchitis                | ?                      | Generalized           | 12              | 74 lbs.               | 72¾ lbs.            | Definite improvement. Slight cough at times.           |
| S. Z. | 6 yrs.  | M.  | Chr. Bronchitis                | 2 mos.                 | Generalized           | 7               | 50 lbs.               | 51¼ lbs.            | Complete disappearance of cough after fourth exposure. |
| M. W. | 5 yrs.  | M.  | Chr. Bronchitis                | 1 year                 | Generalized           | 16              | 36 lbs.               | 38¼ lbs.            | Complete recovery. Improved.                           |
| F. W. | 7 yrs.  | F.  | Chr. Bronchitis                | 18 mos.                | Generalized           | 16              | 48½ lbs.              | 54 lbs.             | Improved.  |
| L. W. | 8 yrs.  | F.  | Chr. Bronchitis                | 7 mos.                 | Generalized           | 15              | 50 lbs.               | 52¼ lbs.            | Improved.  |
| B. W. | 9 yrs.  | F.  | Chr. Bronchitis                | ? years ? repeated     | Generalized           | 14              | 54 lbs.               | 55¾ lbs.            | Doubtful.  |
| M. W. | 5 yrs.  | F.  | Chr. Bronchitis                | winter coughs          | Generalized           | 19              | 32½ lbs.              | 40 lbs.             | Definite and complete recovery. Improved.              |
| U. T. | 5 yrs.  | F.  | Bronchitis following pertussis | 3 mos.                 | Generalized           | 3               | ?                     | ?                   | Doubtful   |
| I. R. | 7 yrs.  | M.  | Chr. Bronchitis                | 3 yrs.                 | Generalized           | 10              | 47 lbs.               | 48 lbs.             | Coughs much less than formerly. Improved.              |
| J. R. | 9 yrs.  | M.  | Chr. Bronchitis                | 11 mos.                | Generalized           | 13              | 54¼ lbs.              | 56 lbs.             | Definite improvement.                                  |
| L. R. | 12 yrs. | M.  | Chr. Bronchitis                | Repeated winter coughs | Generalized           | 14              | 71 lbs.               | 75½ lbs.            | Improved   |
| J. M. | 11 yrs. | M.  | Chr. Bronchitis                | 7 mos.                 | Generalized           | 10              | 70¼ lbs.              | 70 lbs.             | Unimproved.  |
| P. C. | 5 yrs.  | F.  | Chr. Bronchitis                | 2 yrs.                 | Generalized           | 14              | 41¼ lbs.              | 40¼ lbs.            | Improved.  |
| R. L. | 4½ yrs. | M.  | Chr. Bronchitis                | ?                      | Generalized           | 14              | 34 lbs.               | 36½ lbs.            | Improved.  |
| E. B. | 10 yrs. | F.  | Chr. Bronchitis                | 18 mos.                | Generalized           | 12              | 68½ lbs.              | 69 lbs.             | Improved.  |
| S. R. | 7 yrs.  | M.  | Chr. Bronchitis (Koch)         | 2 yrs.                 | Generalized           | 20              | 45¾ lbs.              | 46¼ lbs.            | Unimproved.  |
| J. P. | 9 yrs.  | M.  | Chr. Bronchitis                | 20 mos.                | Generalized           | 15              | 66 lbs.               | 68 lbs.             | Improved.  |
| T. M. | 2 mos.  | M.  | Enlarged Thymus                | 1 week                 | General and localized | 6               | 13¼ lbs.              | 15 lbs. 9 oz.       | Definite improvement.                                  |
| I. M. | 5 yrs.  | M.  | Chr. Bronchitis                | 2 yrs. off and on      | Generalized           | 13              | 34 lbs.               | 35½ lbs.            | Improved.  |
| E. M. | 4 yrs.  | F.  | Chr. Bronchitis                | 5 mos.                 | Generalized           | 11              | 32 lbs.               | 32½ lbs.            | Doubtful.  |
| M. M. | 9 yrs.  | F.  | Chr. Bronchitis (Koch)         | 4 yrs.                 | Generalized           | 21              | 53 lbs.               | 54¼ lbs.            | Unimproved.  |
| M. M. | 3 yrs.  | F.  | Chr. Bronchitis                | 1 year                 | Generalized           | 17              | 30 lbs.               | 32 lbs.             | Improved.  |
| G. G. | 3 yrs.  | F.  | Chr. Bronchitis                | 7 mos.                 | Generalized           | 9               | 32¼ lbs.              | 33½ lbs.            | Improved.  |



|         |                      |    |                           |                            |                              |    |                       |                       |   |
|---------|----------------------|----|---------------------------|----------------------------|------------------------------|----|-----------------------|-----------------------|---|
| M. G.   | 5 yrs.               | F. | Chr. Bronchitis           | 2 yrs.<br>off and on       | Generalized                  | 14 | 39 $\frac{3}{4}$ lbs. | 41 lbs.               | Improved.   |
| A. G.   | 12 yrs.              | F. | Chr. Bronchitis           | 6 yrs.                     | Generalized                  | 22 | ?                     | ?                     | Cough completely disappeared. En-<br>docarditis unimproved.             |
| F. W.   | 8 yrs.               | M. | Chr. Bronchitis<br>(Koch) | 2 $\frac{1}{2}$ yrs.       | Generalized                  | 11 | 48 lbs.               | 47 $\frac{3}{4}$ lbs. | Unimproved.   |
| I. E.   | 3 yrs.               | M. | Chr. Bronchitis           | 3 yrs.                     | Generalized                  | 12 | 30 $\frac{1}{4}$ lbs. | 31 lbs.               | Doubtful.   |
| R. E.   | 6 yrs.               | M. | Chr. Bronchitis           | 7 mos.                     | Generalized                  | 10 | 47 $\frac{3}{4}$ lbs. | 48 $\frac{1}{4}$ lbs. | Improved.   |
| J. R.   | 16 mos.              | F. | Enlarged Thymus           | Birth to<br>16 mos.        | Generalized<br>and localized | 13 | 18 $\frac{1}{2}$ lbs. | 19 44 lbs.            | Brassy cough disappeared after three<br>exposures. Comp. recovery. Imp. |
| R. McC. | 5 mos.               | F. | Enlarged Thymus           | Birth to<br>5 mos.         | Generalized<br>and localized | 23 | 16 lbs.               | 19 lbs.               | Cough improved after eight exposures<br>Complete recovery.              |
| C. D.   | 9 yrs.               | F. | Chr. Bronchitis           | 2 $\frac{1}{2}$ yrs.       | Generalized                  | 14 | 64 $\frac{1}{4}$ lbs. | 66 lbs.               | Improved.   |
| S. R.   | 10 mos.              | F. | Enlarged Thymus           | Birth to<br>10 mos.        | Generalized<br>and localized | 10 | 19 lbs.               | 21 $\frac{3}{4}$ lbs. | Cough improved after five exposures.<br>Complete recovery.              |
| H. C.   | 3 $\frac{1}{2}$ yrs. | M. | Chr. Bronchitis           | 2 yrs.<br>winter<br>coughs | Generalized                  | 23 | 40 lbs.               | 43 $\frac{1}{4}$ lbs. | Improved.   |
| B. C.   | 6 yrs.               | F. | Chr. Bronchitis           | ?                          | Generalized                  | 18 | 63 lbs.               | 71 $\frac{1}{2}$ lbs. | Improved.   |
| D. D.   | 21 mos.              | F. | Chr. Bronchitis           | 9 mos.                     | Generalized                  | 8  | 18 $\frac{1}{2}$ lbs. | 19 $\frac{1}{4}$ lbs. | Improved.   |
| G. G.   | 3 yrs.               | F. | Chr. Bronchitis           | 4 mos.                     | Generalized                  | 11 | 29 lbs.               | 30 $\frac{1}{2}$ lbs. | Improved.   |

aggravated by increased blood supply to the part, therefore, hemorrhagic episodes frequently follow. Quartz light should be used cautiously or not at all prior to menstruation.

Lastly it should be recalled that these individuals who are unusually susceptible to sunlight are not suitable cases for artificial heliotherapy. In the latter group of patients there is danger of producing severe reactions by the injudicious use of quartz light. Malignant growths of the skin have in several instances been traced to ultra violet exposures.<sup>3</sup>

#### DANGERS FROM QUARTZ LIGHT

These may be summed up as follows:

(1) Erythema and dermatitis which vary from slight redness to blistering. All intermediate grades of dermatitis have been observed. Burns usually result from over-zealous treatment, i.e. large doses from the start, and are also seen following exposures before the patient's skin has acquired a tolerance for the rays. It is particularly prone to occur in those persons with tender derms and is less frequently met with in brunettes, dark complexioned individuals, and members of the colored race. Burns are prevented by carefully regulating doses of ultra violet, being careful not to over expose the patient who undergoes treatment.

(2) Conjunctivitis is an unpardonable error since it can be entirely prevented by the use of goggles or covering the eyes of the patient treated with a towel. The annoying symptoms of the eyes are in our experience far more frequent in assistants than in patients. Workers, after a while, are apt to become lax in the use of darkened eye glasses when rendering treatments, with the result that severe inflammation of the mucous membrane of the lids is experienced several hours later. This type of conjunctivitis is treated by the use of ice compresses applied to the lids and the instillation of a few drops of a 15 to 20 per cent Argyrol every four hours.

(3) Hemorrhage has already been referred to in speaking of contraindications. It is seldom seen in children with tuberculosis because of the difference in the types of Koch infection, from that seen in adults, during early childhood.

(4) Irritative bronchitis. This condition has not been our experience with those individuals treated at the Quartz Light Department of the Jefferson Hospital. It is most likely to be noticed soon after the installation of a new lamp or quartz burner and is dependent upon the larger amount of ozone liberated when the light is at first turned on. A continuous current of fresh air in the light room prevents this type of bronchitis.

#### INCIDENCE OF STUDY

Thirty-seven children, consisting of 15 boys and 22 girls, received ultra violet therapy for chronic bronchitis. Arranged according to ages the number of children were as follows:

|                 |                |
|-----------------|----------------|
| 2 months.....1  | 5 months.....1 |
| 10 months.....1 | 1 year.....1   |
| 2 years.....1   | 3 years.....5  |
| 4 years.....2   | 5 years.....6  |
| 6 years.....4   | 7 years.....3  |
| 8 years.....3   | 9 years.....5  |
| 10 years.....1  | 11 years.....1 |
| 12 years.....2  |                |

The average duration of cough was about ten and one-half months. Arranged according to length of time during which period the cough existed in children treated prior to ultra violet exposure the incidence is as follows:

| Duration<br>of Cough | Number of<br>Patients |
|----------------------|-----------------------|
| 2 months.....        | 2                     |
| 3 months.....        | 1                     |
| 4 months.....        | 1                     |
| 5 months.....        | 2                     |
| 7 months.....        | 4                     |
| 9 months.....        | 1                     |

|                  |   |
|------------------|---|
| 10 months.....   | 2 |
| 11 months.....   | 1 |
| 1 year.....      | 2 |
| 18 months.....   | 3 |
| 20 months.....   | 1 |
| 2 years.....     | 5 |
| 2 1/3 years..... | 1 |
| 2 1/2 years..... | 2 |
| 3 years.....     | 1 |
| 4 years.....     | 1 |
| 6 years.....     | 1 |

In six children the parents could not remember the length of time during which their coughs existed, although all in this group admitted the chronicity of their bronchitis.

Four of the thirty-seven cases were secondary coughs due to enlarged thymus. Twenty-eight were cases of simple infectious bronchitis; three, chronic tuberculous bronchitis; and one a simple bronchitis complicated by endocarditis. In one child bronchitis remained as a sequence to pertussis.

Thirty-three children received generalized exposures while four with enlarged thymi received the combined treatment with ultra violet. The average exposures per capita was about seven. The exposures were usually bi-weekly with an interval of one or two days.

The table below indicates in detail the number of exposures with ultra violet given to various children who received treatment.

| No. of Exp,<br>Ultra Violet. | No. of<br>Children | No. of Exp.<br>Ultra Violet. | No. of<br>Child'n |
|------------------------------|--------------------|------------------------------|-------------------|
| 3.....                       | 1                  | 6.....                       | 1                 |
| 7.....                       | 1                  | 8.....                       | 2                 |
| 9.....                       | 1                  | 10.....                      | 4                 |
| 11.....                      | 3                  | 12.....                      | 3                 |
| 13.....                      | 3                  | 14.....                      | 6                 |
| 15.....                      | 2                  | 16.....                      | 2                 |
| 17.....                      | 1                  | 18.....                      | 1                 |
| 19.....                      | 1                  | 20.....                      | 1                 |
| 21.....                      | 1                  | 22.....                      | 1                 |
| 23.....                      | 2                  |                              |                   |

Of the thirty-seven cases studied, thirty or 81 per cent, gained weight during the course of treatment with ultra violet; five children or 13.5 per cent showed a loss of weight during the exposures. In two children, or 5.5 per cent, the weights were not recorded.

Of the five cases in which loss of weight occurred one child had tuberculous bronchitis, while four were treated for simple bronchitis.

All children with enlarged thymuses gained weight during ultra violet therapy.

The above results are sufficient evidence to prove that ultra violet therapy does in some manner, as yet unexplained, influence metabolism, justifying the expression of "food rays," a surname by which ultra violet is sometimes known.

Results secured through ultra violet therapy were recorded under the following headings: (1) Improved. (2) Doubtful. (3) Unimproved.

1. *Improved.* By this term we included all those children in whom there occurred a complete disappearance of the cough for at least two weeks following therapy with ultra violet, or a trivial cough as contrasted with the original bronchitis. Other symptoms of improvement observed were gain in weight, or stationary weight; increased appetite and a general feeling of well being. Twenty-nine or 78.3 per cent were considered improved.

2. *Doubtful.* Those children in which ultra violet medication was considered of questionable value. In some children of this group quartz light therapy was complicated by the use of drugs without such knowledge by the physician in charge of the Quartz Light Department and not revealed by parents until after several exposures. Four cases or 10.8 per cent were included in this group.

3. *Unimproved.* This class of children included those whose coughs remained the same after several exposures (usually six). Four

patients or 10.8 per cent belonged to this group. In this connection it is interesting to recall that three children were afflicted with tuberculous bronchitis. In the latter group two children gained weight during quartz light therapy, while one lost weight. The other child who showed a loss in weight belonged to the simple non-tuberculous group.

#### CONCLUSION

1. Ultra violet light, also known as artificial heliotherapy, quartz light, and mercury vapor quartz light, is of distinct value in the treatment of chronic bronchitis in children.

2. Its greatest usefulness is to be found in those types of chronic coughs ordinarily not benefited by routine drug therapy.

3. Non-tuberculous bronchitis yields far better results with quartz light than does bronchitis of Koch origin.

4. Ultra violet therapy is of value for enlarged thymus. Its use in this condition is not unlike roentgen therapy. Under the influence of quartz light children with enlarged thymuses lose their wheezing often heard, dyspnoea improves and the thymic stridor rapidly disappears.

5. A comparatively new and valuable non-medical means of treating chronic bronchitis in the young is reported by a study of a series of thirty-seven infants and children, and its further use encouraged.

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## DIATHERMY, A VALUABLE AID TO THE INDUSTRIAL SURGEON\*

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VERMILION, S. D.

When a wound heals without gross evidence of infection it has healed by "first intention." All industrial wounds are infected with various pathogenic organisms at the time of injury. If the wounded parts are liberally supplied with nutrition from an unobstructed circulation of the blood and lymph, and if the blood has a normal amount of protecting enzymes and antibodies, a slight infection introduced at the time of injury may be overcome by nature's own effort unaided by artificial means. Most wounds develop sepsis if no surgical intervention takes place, in which case healing is by "second intention." The reactions of healing and inflammation are always the same in every infection regardless of cause.

When nature heals a wound by "first intention" she calls into use arterial hyperemia and local heat or fever. By arterial hyperemia, tissues are supplied with abundance of nutrition and local concentration of leukocytes, opsonins, cytolytic enzymes, agglutinins, and anti-toxins. All these substances are chemicals and their action is chemical in nature.

Increased heat hastens chemical activity, dilates vascular lumina, lymphatic and intercellular spaces, permitting injured cells to be bathed in an enzyme lymph. This local development of heat greatly increases and quickens the activity of all protective substances and a small amount of infection may be killed before much sepsis becomes evident. These forces constitute nature's first line of defense.

Healing after considerable sepsis is developed by "second intention." Here pathogenic germs are greater in numbers, of greater viru-

lence in the wounded tissues. These tissues have poor nutrition and poor resistance, caused by obstruction to the blood and lymph streams which should normally nourish them. Unaided nature cannot produce an arterial hyperemia in the area of injury because many of the lymphatics, blood capillaries and larger vessels are crushed by mechanical injury or closed by muscle spasm resulting from pain.

If the blood stream is stopped a condition of ischemia exists which means death to the tissues involved. Dead tissues furnish an excellent field for the growth of bacteria. If the blood stream is slowed a passive hyperemia results. This greatly lowers normal resistance, and the germs, finding no considerable opposition, spread rapidly into the tissues. The cells of these tissues object to the severe irritation of the invading organisms and their toxins, and the blood further protects them by throwing out inflammatory exudates into the tissues and around the cells within and well beyond the infected area. This exudate is intended by nature to prevent ingress of toxins and bacteria into the lymphatics and general circulation.

This step is nature's second line of defense. In making this step nature admits that her first line of defense is unable to withstand the enemy and she must gain time in which to prepare immunity, even at the expense of sacrificing tissue substance or function. In the preparation of immunity a certain amount of toxins and bacteria are needed, but by preventing the sudden ingress of septic material the chance is given to the tissues of the body to create a greater amount of protecting enzymes, and to construct new blood channels to carry these into the infected field. While nature is thus mobilizing

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her forces of immunity, she is sustaining a loss on the field of combat. She is retreating and sacrificing her rear guard or shock troops in the infected area. Sometimes this loss is great and amounts to the death of a large mass of tissue or a whole organ. Every inflammatory exudate acts like a splint, except that it is applied in the intercellular spaces. The greater the exudate the tighter the splint; and although this aids in localizing infection, a dangerous pressure congestion or ischemia may result. Both of these conditions favor the growth of bacteria and delays or prevents healing. This so-called splint limits the cellular or tissue function, else it would be of no use during an acute inflammatory process. The exudate must be entirely absorbed and nutrition again restored to all the cells before there is a complete return of function. Complete absorption never takes place, although following mild acute infections, nature may soften and dissolve the inflammatory exudate to such an extent that we cannot measure the amount of function lost. In chronic infections the inflammatory exudate is long retained as a barrier against infection, and when absorbed its place is filled by fibrous tissue which has a contractile nature. The functioning cells surrounded by it are compressed and poorly nourished. The tissues poisoned by toxins, and bound by fibrosis, become hardened and shrunken and their function is reduced.

Unaided, nature cannot resolve all this fibrosis, therefore she has sacrificed function for healing in every case where healing by second intention obtains. The best way to prevent this loss is to imitate nature by supplying the injured parts immediately with sufficient arterial blood and lymph, and utilizing heat to activate the chemistry of the protecting enzymes. These principles are fundamental in the physiology of healing.

In all therapy the true scientist should seek to imitate nature. If we can produce physiological reactions artificially no one has a right to call the method empirical.

Proper surgical treatment of any industrial injury requires restoration of injured parts, debridement, antisepsis, drainage, and perhaps specific medication. With all these, healing would be a miserable failure if nature's first line of defense should prove to be inadequate. Treatment should not stop with mere surgical routine. We should use any method that will imitate nature by starting, quickening and amplifying natural physiological reactions necessary for healing. This can be done by using heat generated within each cell both in and around the injured area. This heat has a very wide range of usefulness. Just as in a steam engine, so in our bodies, heat is the basic factor. It is necessary to the vital processes of nutrition, repair and protection. When the temperature of tissue is lowered, metabolism and other clinical processes are slowed. When the temperature is increased to a physiological limit, all the vital processes are accelerated. When heat is generated within the deep tissues, the blood vessels are compelled to dilate and the heart forces an enormous flow of fresh arterial blood through the injured tissues, supplying abundant nutrition and local concentration of activated phagocytes. The opsonic index can be raised to three or four or even seven times that of normal. The action of all enzymes and anti-bodies are quickened and their production is greatly increased. Osmosis is increased, acute inflammatory exudates are digested and quickly absorbed and carried away by the blood and lymph. This form of therapeutic heat is the greatest absorptive agency known. It is also very sedative, often more sedative than morphine. Pain which is caused by injury, muscle spasm, or concentration of toxins is greatly relieved. It sedates the injured nerves, relaxes spasm and causes toxins to be neutralized, absorbed and carried away. The tissues of the body enjoy this sedative heat up to 115 or 116 degrees Fahrenheit. The effect of this heat upon the invading bacteria is just opposite from its action on body tissue. Germs are attenuated and some of them are killed by the rise of temperature. When



fresh wounds are properly drained and treated by this application of heat, there is an increased discharge of lymph which prevents the spread of bacteria by washing them away.

With this antagonizing influence against them, the bacteria are unfitted for their advance against nature's first line of defense, which has been re-enforced by this same influence.

If these remedies are properly and promptly applied, most wounds will become sterile before gross evidence of infection can develop; and nature will have very little or no need for falling back to her second line of defense, by using the inflammatory exudate.

Heat therapy should be our first thought in treating chronic infections and conditions where fibrosis has caused stiffness, atrophy, and reduced function. If heat is generated in the hardened tissue a greater arterial blood supply is assured and the fibrosis is relaxed and softened. This enables the blood to partly dissolve the fibrosis around the functioning cells and they with more nutrition and room for activity, regain at least part of their lost function. By this method many apparently hopeless cases of stiff joints can have considerable function restored if treatment is continued sufficiently long.

If other forms of physical therapy are added to this treatment of fibrosis a greater return of function may be confidently expected than by any other means.

The most practical application of the intracellular heat is made possible by the high voltage, high frequency electric current as delivered by a properly constructed instrument using the D'Arsonval circuit. The principle of this method is based upon the fact that each body cell offers some resistance to the passage of an electric current and wherever there is resistance it is possible to produce heat. Since the current can be driven into any part and to any depth of the body, we are assured that heat can be developed wherever the tissues need it. This type of heat

we call "conversive heat" or "diathermy." Heat from this source is a most dependable remedy. We can regulate it at will and put it where desired. With it we can initiate, accelerate, and multiply nature's own chosen healing reactions. Often within thirty minutes' time we can accomplish more than nature can do in three days without its aid. In shock this is the best way to supply warmth to the vital organs without loss of the body's energy.

There are two methods of using diathermy. The sedative method and the stimulating method. The sedative method requires that the heat be so slowly built up that at no time are the tissues disturbed by the stirring up of adverse reflexes. It is used for sedation, absorption, and germicidal purposes.

The stimulative method is used for increasing nutrition and hastening healing. Fractional doses of heat are used and a few slightly irritating reflexes are encouraged. This treatment is a great aid and time saver in fractures where nonunion is threatened. A study of the effects of conversive heat suggests the indications and contra-indications.

Diathermy should not be used where its great absorptive effect might flood the circulation with emboli or overwhelm the body with a dangerous amount of bacteria or toxins, nor where serious or uncontrollable hemorrhage might be started.

Diathermy is indicated in any infection or pathological condition where not contra-indicated.

#### CASES ILLUSTRATING PRINCIPLES OF DIATHERMY

Case 1. Abdominal wound. Penetrating to back bone, cutting intestine, spilling bowel contents into peritoneal cavity, with complete extrusion of small bowels, which were badly soiled with dirty hands. Treatment: Surgical repair, cleansing, drainage, diathermy one hour



twice daily for five days. One-half hour daily for five days. Pus, odor and peritonitis did not develop. Recovery smooth as clean appendix case.

Case 2. A young man shot away the middle of his left thigh bone, leaving the upper fragment longitudinally split. The wound was treated surgically and the leg allowed to shorten slightly so spicules of bone might come together. Sedative diathermy was used for one and one-half hours twice daily for two weeks, passing the current through the entire left thigh. His recovery was smooth and absolutely no infection developed. Union had taken place in four weeks. He was allowed to walk on crutches in eight

weeks using his leg in twelve weeks, and in thirteen weeks after the injury he was plowing corn. No swelling developed after treatment began nor did the muscles atrophy during convalescence, as is usual in such cases.

Case 3. A young lady injured in an automobile wreck. The right knee was penetrated by glass which cut a two-inch gash exposing the synovial surfaces of the bones.

The usual surgery with simple drainage was done and one and one-half hours of sedative diathermy was given twice daily for one week. Slight pain, but no swelling nor infection developed. The patient was discharged two weeks after injury.

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**Treatment of Acute Anterior Poliomyelitis with X Rays, Diathermy and Electricity. G. Chizzola. *La Radiologia Medica*, Vol. XIV, March, 1927. (Abstract *Journal de Radiologie et D'Electrologie*, Vol. XI, No. 7, July, 1927.)**

The author has treated 62 cases of poliomyelitis, following the method of Bordier. He attributes the numerous cures he obtained to this treatment. But he does not exclude electrotherapy in his method and he assigns to it an important place in the treatment of this disease, if it is employed correctly. He insists on the necessity of irradiating the very first weeks immediately after the febrile period, and to utilize large portals of entry because of the distribution of dead cells over a more or less great extent.

Each series of radiotherapy is followed by a dozen sessions of diathermy of small intensity, the object being to impart to the paralyzed limb a temperature equal to about that of the normal.

When the inflammatory phenomena have completely disappeared the author employs a prolonged electrical treatment repeated at intervals of a month to six weeks. The basis of the treatment is the galvanic current of 4 to 5 ma. When he adds to the constant current, a motor excited current, he prefers to employ the sinusoidal current, because this current acting entirely on the motility, irritates least the sensitive innervation; is better tolerated and excites at the same time the smooth muscle fibers of the vascular wall.

Of 62 cases, the author has obtained 23 complete cures and 11 cures with slight defects; he has only had

nine failures, all of the others having been more or less improved.

These statistics are very interesting and very encouraging, but the degree of seriousness of the disease is difficult to ascertain, electro diagnosis not being always reliable; nevertheless it was employed among 18 patients, all of whom presented the reaction of degeneration (X. X. X.). But it would have been preferable if the degree of degeneration had been mentioned. In fact it is not known whether it was complete or partial. There is one exception: The patient, No. 50, has been examined at the beginning and at the end. At the end he had improved so well that he only presented partial degeneration of the anterior tibial muscle. When he entered he had a very serious atrophy, with hypothermy and very short R. D.

In conclusion the author states that the method of Bordier has improved the prognosis of acute anterior poliomyelitis.

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**The Physical Principles and the Physiological Effects of Diathermy. *Le Journal Medical Francais*, April, 1927.**

The authors review the principles of generators of high frequency. Apparatus of Tesla and of D'Arsonval, apparatus with interrupted waves, with continuous waves, lamps with three electrodes, etc., are mentioned.

The physiological effects of diathermy are discussed. The principal physiological effects of diathermy are: vaso-dilation, action on the blood, analgesic action and antispasmodic action.

## RADIANT HEAT AND LIGHT IN THE TREATMENT OF LEG ULCERS AND ALLIED CONDITIONS\*

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Among the intractable and wearisome conditions which the medical profession is called upon to treat, probably all will agree, the leg ulcer and the allied trophic disturbances of the lower limbs appear in the first ranks. Dressings and dressings, and more dressings, changes in types of dressings and application; three, six, nine months and even one and two years to obtain a cure. The patients are despondent and irritable, often wandering away to other physicians, and many times to unscientific healers.

I offer for consideration a method of treatment which has given quite uniform results, and can be detailed somewhat dogmatically as follows: Relief from pain in one to three weeks, and complete cure in four to six weeks. Perhaps it will be said that this sounds like a patent medicine advertisement, but I am aware that I am not dealing with a gullible public, but with those who have the ability to test out the methods to be detailed later, and therefore I feel that neither exaggeration or conservatism are advisable, but the exact truth, as near as I can convey it. I might say I have been using this method of treatment with slight improvements as I proceeded since 1917, and have had sufficient experience to feel that it is no experiment.

I shall mention two rather exceptional cases which are closely allied to leg ulcers, due to some of the same pathological conditions, and you may have met similar cases and know their intractability.

(a) W. V., age 76. Interstitial nephritis. Blood pressure, systolic 180. Otherwise normal for his age. Right great toe became swelled, red and tender. Over a period of three months the swelling and discoloration extended to the

balance of the toes on that foot. The toes swelled more, became wine color, and the swelling and color extended up over the instep. A physician consulted diagnosed it as infection, and opened the right great toe. For a month the wound remained open, and then a black spicule of bone protruded. Two physicians, consulted separately, advised amputation of the foot. The patient was brought to me whimpering and crying, with his morale at a low ebb. This foot was treated with radiant heat and light, as hereafter detailed, with the addition of the removal of the dead bone, and the injection of the metacarpophalangeal joint with carbolic acid, with the result that within eight weeks the wound was healed, the swelling of all toes gone, and the color normal. The infected joint which was broken down, was ankylosed as would be expected.

(b) C. E. L., age 67. Interstitial nephritis, anaemia, emaciation. I was called to examine and treat his right foot, which he stated he had been treating for about three weeks. The toes and foot were markedly swollen and deep wine color, while heavy flaps and tags of skin hung from the plantar surfaces of the toes and anterior portion of the foot. Pus and bloody serum dripped from these skin tags and there was a black necrosed spot the size of a pea on the ventral surface of the great toe. The left foot seemed quite normal, and called for no treatment. I gave this foot similar treatment to that mentioned below, and in just three weeks the patient had a healthy pink foot. He afterward stated this foot felt stronger and better than his left foot.

I shall not burden this report with histories of leg ulcers, as I am sure the reader is familiar with the average run of history given by these patients.

\*Submitted in Thesis Contest, American College of Physical Therapy, 1926.

As to the method of procedure, I shall try to detail accurately the steps.

As we all know a larger per cent of these ulcers are due to poor circulation, either local or general, and yet we must look out for the specifics, diabetics, focal infections, and then give tonic treatment and get the patient in as good physical condition as possible. For this poor circulation I use radiant heat, and let me emphasize that for local treatment of ulcers there has never been anything that could compare with it. However the application, dressings and bandaging mentioned below are absolutely necessary if you expect to get first class results. I advise patients to keep off their feet as much as possible, and, whenever they sit down, to place the affected leg on an elevated plane on another chair to help the return flow of blood. However, I have had patients who were unable to keep off their feet to any extent due to their occupations, and I am frank to say there did not seem to be any great increase in the treatment period in these cases. Treat daily for the first two or three weeks, that is until you see that any local swelling has subsided and the color of the surrounding tissues is good. The treatments may be given every other day until the healing process is complete. Apply the 1000 watt lamp at 12 inches distance from bulb to ulcer for fifteen minutes. If the circulation is very poor in the parts it may be necessary to start with the lamp at 20 inches, and gradually, over a period of four or five days, lower the lamp to within 12 inches.

I have no special confidence in colored screens or bulbs, and have gotten all results with a plain type C Tungsten bulb. Do not manipulate the ulcer in any way for the first few days, except to paint with 2 per cent mercurochrome, and apply the dressings. After each radiant heat application, paint the ulcer as mentioned above, apply a small pad of sterile gauze one-fourth inch thick and slightly larger than the ulcer area, and over this a two and one-half inch cloth elastic bandage from the toes to

two inches above the varicose veins. If none exist, bandage to a point just above the calf of the leg. After about three days, the ulcer will look much drier and healthier, but there may be a tendency for crusts to pile up about or even over the ulcer. Then instead of the mercurochrome, apply a liberal amount of 5 per cent scarlet red over the crusted area, and over this a few layers of gauze, some oiled silk or paraffin paper and the elastic bandage. The next day the crusts will come off in a macerated form. The ulcer will show a heavier discharge and will not look so good. Nevertheless it is progressing. Wipe away the discharge from the ulcer surface, apply the lamp and return to the mercurochrome painting. Repeat the above process within the next few days if necessary, and shortly you will be pleased to see a healthy granulating ulcer base, with the much desired blue rim, which indicates the closing in process. Treat for six days after the discharge disappears and the final healthy crust appears, and then apply the final scarlet red dressing which will bring away the crust and leave a quite normal surface.

Are there exceptions to these results? Yes. Once in a while the response is not so good, the ulcer remaining sluggish and lifeless in appearance. Take then a scrub brush, biniodide soap and water and give the ulcer quite a brisk scrubbing. The patient will not enjoy this especially, but will forgive you within the next day or two when he sees the results obtained. Also, in such cases an occasional painting with tincture of iodine is not relished by the patient, but its stimulating action will hasten the repair process.

If your patient has ulcers about the toes or foot conditions similar to the cases mentioned, cover the toes with a heavy layer of cotton, over the dressings and up on to the foot, before applying the bandage so that the pressure may be equalized and the parts made comfortable.

The patient must be informed that poor circulation was the cause or one of the causes

of the ulcers, and that there may be a return of the old condition and more ulcers if the column of blood is not supported by the continuous use

of the elastic bandages or elastic stockings in the future.

Sylvandell Bldg.

## THE TREATMENT OF POSTFEBRILE CONDITIONS WITH SPECIAL REFERENCE TO THE INFLUENZAL TYPE\*

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The increasing number of invalids and near invalids following influenzal and kindred infections prompts the writing of this paper. In checking back through our case records it seems that at no time have we been confronted with so many cases of postfebrile adynamia.

This increase in the number of patients who are unable to regain their health seems to be the outgrowth of some type of bacterium, probably of streptococcic origin, to which the patient in question does not create an immunity.

In some the degree of invalidism is slight, in fact, so slight it may be hard to determine its presence, other than from the history, which dates from some infection following which the patient does not feel well, while in others the degree to which they are affected is very marked up to absolute invalidism.

Following most fevers the body is left in a "run down" condition. This state of health is more or less relative to the type of infection from which the patient suffers. It is probably in direct ratio to the resistance which that particular individual has toward that particular type and virulence of bacteria.

### SYMPTOMS

Many and diverse symptoms are manifest in these patients, depending upon which organs are attacked, upon the extent or localization of

the infection, and upon the degree to which the infection has developed, and also upon the chronicity of the case.

In our series of cases those attacking the chest were most frequently seen, and whether the patient has lung abscess, delayed resolution following pneumonia, or pleuritic infection, bronchitis of its many types, or bronchiectasis, the fact still remains that we have an infection, generally of low type, that the patient does not overcome.

Nearly all these patients are referred to the physical therapist rather as a last resort, they having received full medication, and many of them having been rubbed and manipulated without results.

I believe many of these patients are passed by as neurotics, or tending that way, while others are advised to seek a change of climate or a trip to the sea shore, or some other makeshift, when it lays in our power to relieve them if we will go to the bother to see that they are properly radiated.

We should be very careful that we do not confuse the invalid of the postfebrile type with one of the neurotic type, as there is a wide margin of difference in treatment of these two conditions. The nervous individual is nicely summed up by Dr. J. Madison Taylor in an article in the May, 1926, number of "Clinical Medicine," entitled "The Nervous Invalid and the Decrepit

\*Read at Sixth Annual Meeting American College of Physical Therapy, Chicago, Nov. 3, 1927.



Invalid," in which he states: "The nervous invalid is the product of emotional shocks; of his own misinterpretation of actualities; of timidity or of disinclination or dread of facing the facts; of viewing these facts in the wrong prospective; also of the secondary causes which conspire to precipitate these conditions. Likewise he has tenacious habits of dwelling anxiously and luxuriously upon his relationships to realities and the industrious fabrication of unrealities, or even illusions."

As you all have perceived, the neurotic is self-centered, and accepts only such statements from you as fit with his own conception of his ailment, ignoring any and all advice that opposes in any way his actuated idea of himself. While the truly sick individual is an invalid, not by choice or anomaly of thought, but by virtue of having had his body assaulted and his health undermined by actual organic invasion, his mentality as a rule being, aside from some depression, unaffected. Of course the picture is not always clear, as we meet many and diverse admixtures.

In the bronchitic type, in our experience the most distressing single symptom, and many times the one thing that drives the patient to the doctor, is a dry, harsh cough, lasting many times two or three hours. In one case the cough was nearly continuous, the patient being scarcely able to sleep. Also many of these patients have difficulty in lying down. They are able to lie down after they once get there, but the trouble is to get down.

In many of these cases it has been our observation that, although the pathology is quite marked, the symptomatology is fairly negative, that is, it is entirely out of proportion, except that the patient is not well and, in spite of a well regulated regime, he continues to be sick.

The cases which I will report have not been treated in hospitals. In some it has been impossible to make a specific diagnosis. I mean

by this that the finer laboratory findings were not available. A plain clinical, and at times an x ray examination with possibly a temperature chart to aid in excluding tuberculosis, and a Wasserman were all that it was possible to make, or possibly only such examination being made as could be executed by the average country practitioner at the bed side or in his office. Other cases were referred from outlying districts with the usual history of some type of infection which has assumed chronic aspects from which the patient does not seem to recover.

The larger proportion of the respiratory cases exhibit a dry, harsh cough which is very distressing, but which seems to us to be very amenable to ultra violet, becoming productive almost from the first treatment. In fact, if they do not readily acquiesce under this form of treatment we have come to look on them as being, if not tuberculous, at least tending that way. In other words, the relief is quick and permanent in uncomplicated infection of the respiratory tract, whether the case is recent or of long standing, provided it is not tuberculous as above stated, lung abscess, bronchiectasis, the pneumonias in their acute stages or in those cases that are *per se* surgical.

It might be well to here state that the above results are in general. That where there were lung abscesses they were drained and all other foci of infection that required surgical treatment were so treated.

In treating the chronic neurotic invalid we must ever keep in mind, that although they may be relieved of all foci of infection, may have received the very best nursing, they still may choose to remain sick. They are in a state of mind to be sick. They may enjoy being sick and the attendant care that goes with it. Also we have those whose mental attitude is such, they having been sick over a long period of time, they are convinced that they cannot be relieved and, even after they are better, still maintain that they know it will not be permanent.

When it is decided to use ultra violet radiations, especially following medical treatment, one should be very cautious lest the patient has recently had quinine, for an erythema, even though it may be harmless, will many times discourage a patient from taking further exposures, and not only that, but they may believe they have been harmed, thereby defeating the whole program and incidentally laying you open to criticism.

Inasmuch as the effect of ultra violet depends upon the amount absorbed into the system, be sure that patient is nude, exposing every square inch of body surface possible.

It is important that each burner you are using be tested so you will know just how much ultra violet you are giving, as there is a vast difference in burners, even of the same make, and remember also they deteriorate with age.

Our technique for ultra violet radiations has been very simple. We use always a standard distance, it being 30 inches, increasing the dose by giving longer exposures. It has always been our understanding that to decrease the distance changes the wave length, thereby getting out of the physiologic, into the destructive rays. Another point often ignored is the position of the patient to the lamp, some patients lying a little on one side or the other, even to the point of overlapping. Our results have been the best with the patient lying perfectly flat, whether recumbent or prone, and the light so adjusted that the rays will strike as near as possible at right angles.

In suggesting a treatment for postfebrile conditions, we feel that ultra violet, like most drugs we use, is mostly empirical, and we have to judge as in any other medication, any agent we use, by results.

Our series of cases, although small, has been quite convincing. We purposely withheld all medicine from them in order to ascertain, as

near as possible, just how much ultra violet did for them.

Our conclusions, based on a series of thirty-one cases, are as follows:

Cases of delayed resolution following pneumonia—

- (1) Relief of pain (when present).
- (2) Increased expectoration (sometimes voluminous).
- (3) Decrease in number of respirations (if above normal).
- (4) Increase in depth of respirations.
- (5) X ray findings become rapidly negative.
- (6) Conversion of a slow into a rapid convalescence. Following the first or second exposure patient becomes greatly improved.

In so-called chronic influenza and in patients who have had influenza, and although left with no demonstrable foci of infection, but who have not regained their usual health, are unable to do their work, or have to do it piece-meal, and have not responded to the usual medical regime or tonics, vaccines, etc., and still remain in a run down condition, our plan has been to discontinue all drugs and give daily radiations of ultra violet as heretofore described.

Our results have been in these cases:

- (1) Copious expectoration (if the case was bronchial).
- (2) Rapid gain in appetite, weight and strength. In fact a complete return to normal.

One is impressed with the rapidity with which these patients respond, some gaining very fast, while others are much slower in recuperating, requiring weeks to become normal. But, as all these patients were either standing still, so to speak, or losing a little as the months rolled by, we feel very grateful that there is placed at our disposal a means to an end.



## CASE REPORTS

Case No. 1.—Mr. I., age 47. Family history unimportant. Personal history: Patient always well until twelve years ago at which time he suffered from an attack of pneumonia from which he did not fully recover, having frequent attacks of aching, chills and fever, at which times he would be unable to work. These attacks became more frequent until two years ago he became totally incapacitated. Whenever he attempted to work he would be seized with a severe chill which would last an hour or more, and the following fever would many times reach 105; these attacks would last several days after which he would be able to be up around the house.

His doctor states that he has received the usual tonics, vaccines both stock and autogenous, but without avail, that during the past six months his patient was hospitalized for four months, being treated at the Iowa Methodist Hospital.

His status following this period remained unchanged.

*Diagnosis:* Physical examination revealed a patient quite anaemic (Haemog. 65 per cent) and quite emaciated, having lost 38 pounds, his weight still gradually decreasing. There were rales over the base of both lungs. The x ray examination following the injection of iodized oil was quite diagnostic of bronchiectasis. All other tests were negative. Prognosis was quite guarded. First on account of the marked dilatation of the bronchi, and second because of the chronicity of the case together with the fact that the patient had been gradually failing under expert medical supervision over a period of eighteen months.

Ultra violet treatment was started May 1. He went to work July 5 and aside from an attack of influenza has worked continuously since. His weight has increased 17 pounds and he says he feels perfectly well.

Case No. 2.—M. B., age 4. This little patient had been sick over a period of two weeks. Her condition was not considered serious at first, but as the days went on she became desperately ill. Temperature 104, pulse 130, respiration 73. Although her pulse rate was comparatively low she was very cyanotic. X ray of the chest showed no distinct consolidation although there were areas scattered through both lungs that were undoubtedly consolidated, in fact, her lungs showed a typical influenzal pneumonia. The cough in this case was very irritating and when the patient was not in coma, nearly continuous.

Following the first irradiation the cough became productive and it seemed for a time that she might drown in her own secretions, but once she weathered this she began to improve, the delirium began to clear up, and other symptoms soon began to improve. She gave no signs of a crisis and it would have been hard to detect even if she did because the temperature and other symptoms were, from the first, irregular. Convalescence was very short. One of the outstanding features of this case, like so many undergoing this type of treatment, is the prompt return of the appetite. These patients start to eat at once, which may account for a comparatively short convalescence. We at first were very cautious in feeding these patients for fear of the outcome, but have gradually learned that the food given is well taken care of and seemed to help materially.

Case No. 3.—Mr. I. J. B., farmer, age 48. Family history negative. Personal history: Had bad attack of influenza ten years ago from which he did not recover. For the last six years he has been worse and for the past year he has been an invalid unable to do any work and was compelled to remain quiet.

Subjective symptoms were that he was very weak and depressed, had lost 28 pounds, chilled very easily, and thought he had fever at times. He complains of pain upon breathing and a dull

pain in the chest. For the past year or since the removal of his tonsils he spent the major portion of his time in bed.

Diagnosis, based upon negative physical findings, laboratory and x ray, was invalidism and neurasthenia following influenzal infection.

This patient, after a period of two months, is to all purposes well and doing his work. We feel that this result was well worth the effort.

Our results were as follows, of the thirty-one cases treated:

Two are dead.

Two showed no perceptible improvement.

Four were partially relieved.

Twenty-three were returned to their former work and health.

In summarizing these cases, it is well to remember that nearly everything was done to relieve them, outside of physical therapy, before this treatment was begun.

Most of them were either at a standstill or losing as the weeks went by and, in lieu of this, we feel that this type of treatment is well worth the effort.

## TECHNIQUE AND APPLICATION OF WAVE LENGTHS IN DENTISTRY\*

C. B. HOLMAN, D. D. S.

ST. LOUIS

The very structure of the lamps evince one fact—that ultra violet therapy is in its very early infancy. They are merely sources of light and have no specialization for particular application. There appears to me to be a wide field for the experimenter, who will devote his study to specialized lamps or lamps with specialized applicators.

But first, we must know just what efficacy ultra violet possesses and just where on the human body it may be applied to allay a particular disturbance.

Let me remind you again that my profession has limited my use of ultra violet light virtually to the oral cavity and its contents. In a few instances I have digressed somewhat from that particular region, but only at the instance of a patient for whom ultra violet light had wrought a cure or had alleviated some pathological condition of the mouth.

The sources of ultra violet light, produced artificially, fall into two great groups; the mercury vapor lamp and the plain carbon arc. I have found that the types of the former now manufactured are of little practical value to dentistry. They are of their very nature cumbersome and cannot be adapted to practical use in treating oral conditions; again they produce light in which rays of shorter wave length predominate, consequently they lack penetrability and are more caustic than the conscientious man would care to have them for the alleviation of those conditions for which he uses the rays. In other words, they will burn if applied over a period of time sufficient to relieve pain. I have found that the simple arc more than suits my purposes and I believe it will bear a deeper study than the mercury vapor lamp. I say this without prejudice, for there is no gainsaying the efficacy of this source of light, but it is more limited than the arc, primarily because with the arc we are able to produce any type of ray we choose by the selection of the elements which

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are used in the composition of the carbons with which the light is produced.

In this latter fact, I believe, lies the ultimate solution of the current mystery of ultra violet light. The average practitioner of our time has not yet achieved the skill necessary to obtain the real results. He is comparable to the well-meaning doctor of another generation who fed a patient calomel until the desired effect was produced and in most cases other effects which were highly undesirable. He did not seem to realize that a powerful antiseptic would not only render impotent invading bacteria, but would as well destroy human tissue cells. Experiment finally corrected these errors and it was found that the primary effects were produced by minimized dosage without injury to the host.

As with other therapeutic agencies, dosage is of early consideration in the application of ultra violet light. Many men today produce analgesia and antiseptics with the rays, but at a cost of great inconvenience to the patient, for unless extreme precaution is taken, the light will invariably burn and as surely as native sunlight and with the same possibilities of systemic or organic disturbances.

The cases in my own practice on which I base my deductions were treated with my own lamp which I ascertained to be the most efficient by comparison with a score of others of various types. With this lamp I have yet to produce a burn, for the very simple reason that I use carbons from which those elements which produce burning have been eliminated. Nature, with her accustomed heed for order, has arranged for us the spectrum, and, we by virtue of the spectroscopy, are able to see the relation of color to the various elements, so, it is an easy matter to discover just what groups of elements produce the cooler rays, or those in the violet group. It is with these elements and the rays they project that I find the greatest success of ultra-violet therapy.

There are a few simple laws which will infallibly guide the practitioner in his treatments with light. The efficacy of the ultra violet ray depends totally upon its powers of penetration, and the penetrability is in direct proportion to the length of the ray, that is, the longer wave length, the deeper the penetration. It must be remembered that virtually all matter will absorb ultra violet light, hence the difficulty in its projection and the difficulty in centralizing the rays on a local target. We found that shortening the ray facilitates its absorption by most of the elements particularly the metals. As a consequence the best defined results may be expected from a lamp constructed of metallic compounds which will absorb a minimum of rays, permitting a comparatively high concentration to be reflected to the subject. Aluminum manganese alloy is as nearly perfect a reflector as it is possible to secure. With such a reflector we may use carbons of certain compounds which give forth rays specific for certain conditions. With these carbons we are able to regulate the length of the ray. If we desire germicidal action, we project rays of short wave length, for the germicidal value of the rays is inversely proportionate to the length of the ray. Analgesia is best obtained with longer rays, for we find that analgesia is produced in direct ratio to the length of the ray.

Observation has shown me an attribute of ultra violet light which leads me outside my own field, the oral cavity, and which will bear interminable experiment. During treatment for disease of the mouth patients invariably report an increased sense of well-being following the series of applications of ultra violet ray. May we not deduce from this phenomenon that certain systemic changes are wrought by local exposure to the rays? Theorizing on this point, we know that the membranes of the oral cavity, constructed of this moist epithelium, are a more ideal place in the body for treatment of general disturbances? Patients, following treatment, report they are sleeping more easily and that

their weight has increased. Frequently the condition has been of such a nature that it could not affect either weight or sleep, and I feel safe in hazarding the opinion that ultra violet light produces a certain specific reaction in the blood and lymph, particularly in the former. In treating the rather common complaint of bleeding gums, I have found that I can assure the patient that after a single application of ultra violet light the bleeding will cease, provided, of course, that the bleeding has not been the result of an accretion of tartar or of a poorly constructed crown. Certain cases of long standing in which the gum tissue was terribly cyanotic have responded to a relatively few applications and in a remarkably brief time have assumed a healthy and normal condition and none has reported a recurrence.

The ambition of numerous dental and medical research men has long been the discovery of a cure for pyorrhea. A cure is impossible. It is no more possible to cure pyorrhea than it is possible to replace a destroyed or a mutilated heart valve. Pyorrhea destroys the peridental membrane—the fibrous tissue which binds the tooth to the socket in which it is placed—and it is the destruction of this tissue which permits the tooth to become loosened. But I have found that ultra violet light, applied after a thorough prophylaxis will halt the inroads of the bacteria, and, provided the peridental membrane has not been completely destroyed, the affected tooth will become firmly imbedded in its socket and the receded and diseased gum tissue will resume its normal state. With the dentist, just as with the physician, the co-operation of the patient is an essential to the success of his work. Neither is a worker of miracles, and the patient must practice home hygiene if he expects the efforts of the practitioner to be permanent.

It has become a distinct pleasure to me, paradoxical as it may sound, to have a patient complain of pain in the oral cavity, for I have found that no pain I have been asked to relieve has failed to vanish when properly exposed to

ultra violet rays. Fistulous abscesses disappear, and this sensitiveness leaves the affected tooth after draining and a series of treatments with the light. Pain following extraction quickly yields to the simple expedient of holding open the socket and applying the rays. So thorough is the anesthesia in this latter case that further exploration of the socket can be accomplished and spicules of bone, if they be present, can be removed without the slightest discomfort to the patient.

Of the cases I am happiest to report, one is the cure of mandibular osteomyelitis and the relief of a long standing case of tri-facial neuralgia. The first was referred to me after one molar had been draining for eight years. Several teeth in the arc were removed and the patient suffered unbearable pain. Various methods to relieve the pain failed. I then filled the socket with a 2 per cent solution of eosin, which acts as a perfect conductor of the rays, and exposed the affected area to the lamp. After five more treatments, loose sequestra of bone were removed and a healthy growth of tissue appeared. Frequent applications of the light were made and after two months, the patient was able to wear a denture and the affected parts became normal.

It was my privilege to relieve a condition of twenty-five years' standing. A woman, 48, was referred to me with a history of almost incessant suffering from trifacial neuralgia for a quarter of a century. After ten years of torture, Schlosser's operation, the injection of alcohol through the foramen ovale, was performed, with immediate relief. After six years, the old condition reappeared. Teeth were extracted and others devitalized, but the pain persisted for two more years. A second injection of alcohol was without result. The remaining years the patient spent in a fruitless endeavor to obtain relief. Neurectomy was advised, but the patient demurred. Six months ago, she came to me and confessed it was a last and desperate resort. I began treatment with the light with applications



externally and intraorally. The exposures were of about twenty minutes' duration each. After six such treatments, she was relieved of all pain, and the distortion disappeared so that her facial expression became normal for the first time since the initial injection of alcohol. There has been no recurrence of the disturbance.

About a year ago, a young woman came to me with a condition of the maxilla which has been diagnosed as an unusual sloughing of the gum tissue and of the bony structure of the socket. So extensive was the necrosis of bone that approximately three-fourths of the roots of the lateral incisor and adjacent sides of the adjacent central incisor and the adjacent cuspid were exposed. Accompanying this condition was constant discharge of odorless, yellowish discharge. The teeth were extremely sensitive despite the fact that there was no deposit of tartar and no apparent cause for the condition. I anesthetized the area and removed the necrosed bone and all possible sources of mechanical irritation with a careful curettment. Antiseptics applied over a period of several days failed to improve the condition. I then enhanced my treatments with applications of the ultra violet. After several days, I began to see that granulation was beginning. The early progress was slow. After two months the new tissue generated on the lingual and the labial sides joined in the interproximal spaces. A condition of absolute necessity in the care of such cases, for, as long as there is unoccupied space in these interproximal spaces, so long must the dentist expect new infections to take root. At this point, treatments were discontinued, but the patient was kept under observation. I last saw this man in late September, and I was surprised to note that something I had been taught was a virtual impossibility in dentistry had been achieved. The gum tissue, which had practically disappeared when I first saw this patient had regenerated within two millimeters of the normal line. Sensitivity had disappeared in the early treatments. The firmness of the tooth in its socket, while not completely restored, has shown

great improvement, and I am of the belief that in time, this tooth will resume its normal firmness as the new tissues replace the granulation.

Another case in which I probably invaded the field of medicine was one of maxillary sinusitis upon which I stumbled accidentally by inserting a dental broach into a root canal of the first molar in preliminary treatment of an abscessed tooth. I found that the broach penetrated far beyond the apex of the root in question, and a radiograph with the broach in place disclosed that the tip of the instrument had penetrated nearly an inch into the maxillary sinus. I referred this case to a capable physician who confirmed my diagnosis of sinusitis. The tooth had been draining for some time before the patient consulted me, and I can assure you that this channel from the sinus through the tooth had been open for some time. I applied the light both externally and internally in the region of the sinus on alternate days for two weeks. After four applications, pain was relieved, and the patient reported that she slept without difficulty. The tooth was not extracted, and the discharge ceased. Ordinary root canal treatments were then applied, and the canal was permanently filled. After five months there are no symptoms of recurrence.

It has not been my intention to teach anything new regarding ultra violet light therapy. I am not presumptuous and am fully aware that I am only a private in the rear ranks of the beginners. I have only endeavored to recite to you my own observations in my use of this light. It has been a deep satisfaction, I assure you, to have wrought so much good—so much relief to that percentage of the unfortunate who have consulted me, and I am hopeful that the day is near when every responsible member of my profession can profit from my observations or the observations of those whose faith in this newer and more simple therapy is as staunch as my own. I have no doubt that we shall all see the day when ultra violet therapy will be as essential a part of the physician's stock in trade as the stethoscope or the scalpel and as integral

a part of the dentist's equipment as his case of instruments of torture. But a world of research must precede this day. Experimental possibilities in this work are endless, and I feel that each contribution to the practical side of this science,

however small, is only another stone in a structure which will one day be a dominating factor in that great pursuit in which we are engaged—the alleviation of pain.

## HELIO THERAPY \*

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To many of you it may seem strange that one who for a quarter of a century has been actively engaged in problems of pathology and diagnosis, should have the temerity to discuss questions in a field in which he is a comparative newcomer. As, however, the onlooker at various strenuous contests is often in a position to better judge the progress of the strife than are the contestants, so perhaps in various medical matters where marked variance of opinion occurs, the outsider being less prejudiced one way or the other may see the question from a different viewpoint and may perhaps be able to bring help to those who have long been in the battle. Probably with this idea in mind your committee has asked me to prepare this paper on Heliotherapy.

About three years ago my attention began to be directed towards physical therapeutic measures in connection with the clinic that I started in Miami, Florida. Here during the six winter months I found a land of almost constant sunshine and instinctively my attention was directed toward its possible benefits. In order to try this out more carefully I had the roof of the clinic converted into a solarium with provision for complete privacy for patients under observation.

Another reason why heliotherapy appeals to me is that it is a method less liable to financial

exploitation than are many of the other measures now in vogue.

Again speaking as a comparative newcomer into this field, let me express the confusion experienced upon entering it.

Most encouraging is the attitude of the American Medical Association in appointing a committee on Physical Therapy to review in an unbiased manner all available data along these lines and separate the wheat from the chaff.

Concerning heliotherapy, it is probable that much more would be heard about it and its popularity accordingly increased if some enterprising firms could only devise some means of selling natural sunlight as they are now doing for its artificial imitations.

Heliotherapy is one of the oldest of therapeutic and prophylactic measures. The Zoroasterians well said: "Out of the sun comes man, unto the sun man renders homage to the source of his being." In ancient Greece the treatment "heliosis" was in many ways identical with modern heliotherapy. Insolation was also available in the "thermae" of Rome. During the Middle Ages the healing art shared the chaos that was equally experienced by most of the sciences and arts of the earlier civilization. During the nineteenth century sporadic attempts at the "sunlight cure" were made but it remained for Rollier, a former associate of the Swiss surgeon

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Kocher to develop a regular routine and subject the method to careful, systematic investigation. His work brought him into contact with much so-called "surgical tuberculosis" where surgery and orthopedics seemed to occupy the entire field. As a result of his disappointment with the results of the more common method of treatment he established in Leysin in 1903 the first heliotherapy clinic for "external tuberculosis." Since then it has greatly increased in size and others of similar scope have been founded in other parts of the world. Many thousands of persons have received the treatment. Further study seems to have demonstrated important beneficial effects in many other than tuberculous conditions, but of these, more later.

Let us first ask what constitutes the alleged beneficial effects of sunlight. Practically all agree that it is a combination of the tonic effect of fresh air acting directly upon the skin and the ultra violet radiation of the light itself possibly at times assisted by the infra red.

The benefit of the former has been sporadically recognized by various persons for many years past. Thus Bigelow in his *Works of Franklin* quotes from a letter of Franklin as follows: "You know that the cold bath has long been the vogue here as a tonic but the shock of the cold water has always appeared to me, generally speaking, as too violent. I have found it much more agreeable to my constitution to bathe in another element, I mean cold air."

Mayer in his recent book says, "Of the beneficial effects to be observed from regulated solar irradiation, a fair part is attributable to the simultaneous exposure of the body surface to open air under favorable atmospheric conditions. Exposing large areas of skin to cool, dry, moving air results in the following changes: The cutaneous vessels are first contracted and later dilated. The blood pressure rises. The rate of the heart beat is slowed and its strength is augmented. The viscosity of the blood first increases and then decreases while diuresis is promoted.

Immediately after the exposure there is an increase in leucocytes and decreases in erythrocytes which is soon followed by the reverse conditions. Changes of a somewhat similar nature in the blood elements also follow exposures to light. Irradiation alone, however cannot induce the rise in basal metabolism which always follows a properly conditioned air exposure. The increased carbon dioxide output and oxygen intake are accompanied by a slowing of the respiratory action. These changes are interpreted as the result of an increase in the amount of the heat lost from the surface of the body. Hence they are readily produced in an atmosphere of moving, cool, dry air."

Such air baths are used extensively in many places under careful medical observation with selected cases and seem to be followed by excellent results. Mayer quotes Friedlander as advising them in anemia, chlorosis, scrofula, neurasthenia and early pulmonary tuberculosis and considering as contra-indications pleurisy, tendency to nasal infection, disease of the blood vessels, kidneys and nervous system.

It is probable however that this benefit from fresh, moving air is largely overlooked by most physicians using heliotherapy and that they attribute their results practically entirely to ultra violet radiation.

This doubtless serves as an important differentiation between heliotherapy and ultra violet radiation by artificial means and explains why some results are obtained by the former that do not seem possible by the latter. In spite of the fact that heliotherapy seems to have found a very definite place for itself in medicine, there are many divergent opinions concerning certain spheres where it has been widely employed. This is particularly true of surgical tuberculosis. Perusal of Rollier's latest book carefully written and well prepared accompanied as is the text by large numbers of "before and after taking" illustrations can scarcely fail to impress the unbiased reader with the value of the method when

properly applied. If the author is enthusiastic and if others who have had similar experience think similarly, this enthusiasm would seem to be fully justified by the results.

On the other hand, a number of prominent orthopedists make the statement that they consider Rollier's diagnoses inaccurate and have yet to see a true tuberculous joint cured by heliotherapy. The truth as usual lies somewhere between these extremes. It scarcely seems possible that Rollier and all the others following his methods should be wrong in all their diagnoses of tuberculosis, even granting the human liability to error shared by every one following medical study. The position may not be unlike our recent experience regarding the treatment of peptic ulcer. Not many years ago, many, perhaps most, surgeons considered the recognition of this condition to be a definite indication for surgical interference and tried to have this idea receive universal medical acceptance. Many physicians, particularly those of the Sippy school refused to follow the leadership and have finally brought to definite recognition the value of a conservative medical treatment to be tried out fully before the more radical surgical procedure is attempted. You know the results, they need not be here repeated.

Rather than to entirely disregard all these cases reported by many reputable men as valueless and to embark at once on a voyage of radical surgery is it not the wiser way to give the patient the benefit of the doubt and to apply to the conservative method a thorough trial before abandoning it as useless? The answer to this question will doubtless be made in the next few years.

Time forbids the detailed consideration of the various forms of so called surgical tuberculosis reported as amenable to this treatment. Suffice it to say that the preponderance of evidence points to the conclusion that heliotherapy is an important factor in our management of

such cases, whether it be applied alone or as an adjuvant to surgical procedure.

For the same reason no discussion of the wave lengths or angstrom units of direct sunlight in comparison with the mercury vapor or carbon arc lamps will here be made, important though they may be.

The light of the sun is also widely recognized as of great value in a number of metabolic disturbances now prominently before the medical public. Deficient calcium and phosphorus metabolism, possibly associated with parathyroid insufficiency is not corrected merely by giving a diet of high calcium content or by parathyroid extracts alone. It is quite generally accepted that heliotherapy does much to correct this metabolic error and enables the body to better utilize that material that it may possess in an ample but unassimilable amount. If then we can in this way favorably influence metabolism in connection with one endocrine element, why may we not hope to attain equally favorable results with others.

Very interesting results have been obtained by irradiation of various foods prior to their ingestion, this opening up a very fertile field for future study. In this connection it may be of interest to note that Harris in 1743 advocated the superior value in certain diseases now classed as metabolic, of powdered clam shells that had been allowed to lie for a long time in the direct sunlight. There is now a general acceptance of the fact that heliotherapy is of distinct value in hastening the healing of wounds, especially those of an indolent nature, sluggish, chronic ulcers, etc.

In various forms of anaemia this method of treatment has a distinct and often invaluable place. We all know that the ordinary diet contains a sufficient amount of iron to maintain the normal haemoglobin equilibrium and that the ingestion of more iron in different forms is for the most part a useless gesture, the difficulty being an assimilation deficiency.

Can we not well hope for an increased metabolism and hence better utilization of the iron in these cases after heliotherapy that has already been found to occur in calcium deficiency?

Favorable reports seem to justify the treatment in certain skin lesions, particularly psoriasis, acne, some forms of eczema and herpes zoster. In some cases of asthma and bronchitis in adults it has also been used to advantage. Many functional neuroses and so-called asthenic states have received much benefit.

One other question remains to be discussed briefly—Where can heliotherapy be best applied?

Clouds are of course a greatly deterrent factor. The same applies to smoke, dust and fog.

Rollier makes these classifications.

1. Elevated plateaus with abundant sunshine and few clouds.
2. Seashore locations with absence of smoke and dust and with moderate winds.
3. Lowland plains.

The first two are of very nearly equal value, each possessing features not characteristic of the other, while both are superior to the flat country. In all however, heliotherapy properly applied will give clinical results of distinct value.

There are certain contra-indications that must be borne in mind. These are cardiac insufficiency, myocarditis and arteriosclerosis from the cardiac division, nephritis especially when associated with hypertension, bilateral renal tuberculosis and various febrile conditions.

In conclusion we may say that at present heliotherapy can be employed with benefit in a number of conditions among which are:

Non-pulmonary tuberculosis, either as the sole agent or as an adjunct to surgery.

In many metabolic disorders such as acromegaly, rickets, tetany and some forms of so-called chronic arthritis.

In various skin diseases particularly herpes and psoriasis.

For its stimulant or "tonic" effect in many neuroses or conditions of the so-called "asthenic" type when the exact etiology is undetermined even after prolonged study.

#### DISCUSSION

DR. ARTHUR H. RING (Arlington, Mass.): I think we are extremely fortunate in having Dr. Watters here for many reasons. He has been known as a laboratory man and as a clinical diagnostician and his report will give us great deal of information. I cannot discuss the value of heliotherapy. We are not favored here except in the summer with the opportunity. As he is in Florida in the winter he has a splendid opportunity to try this out and he is getting very remarkable results. I am very grateful to Dr. Watters for giving us this excellent paper.

DR. LOUIS FELDMAN (Boston, Mass.): At the Reconstruction Clinic here in Boston, with which I have been fortunate enough to be connected for the past three years, we have had considerable experience in the treatment of the pulmonary type of tuberculosis. I can only say that what Dr. Watters has told you in his meagre way is very true. I think he is a little bit too modest in some of the statements he has made. We have seen all types of tuberculosis, glandular, surgical, bone and joint types and they all seem to show favorable results, sometimes after a very few treatments.

With reference to the question of pulmonary tuberculosis at the St. Louis County Hospital, I spoke to Dr. Samuels, who is a director of that institution, several years ago he stated that his reasons have been definitely valuable in ruling out the artificial ultra violet from a quartz lamp or carbon arc in the treatment of tuberculosis because he found that every case treated that way became worse. Finally they came to the point where they used that as a test before they discharged any of their patients from the institution. If the condition seemed to be arrested in the patient and he was able seemingly to be discharged and his health was improved and he began to feel that he wanted to go out in the world again they gave an exposure to the quartz mercury or arc lamp and if there was tuberculosis there he would be brought down with a temperature and all the signs of an acute infection. That would be reason for him to be put back to bed and he would be tried again later. That was brought out in 2600 cases at that time, and that gives us, with all the other statistics we have, a definite reason

for not using it. In some cases it has produced pulmonary hemorrhage. It is hard to understand why it has such an effect on the localized process and yet will effect pulmonary condition so severely.

DR. WILLIAM BENHAM SNOW (New York City): I do want to take a little exception to Dr. Watters' statements regarding who the physical therapists are, that they are interested in manufacturing concerns, most of them. That is true of those maybe who go around lecturing and are interested in promoting some device. My acquaintance rather gainsays the fact that most of them are interested in something being manufactured. I feel it is only *just* that I should refer to this for I know the doctor has been misinformed.

Another thing I want to allude to is the team work in physical therapy. While heliotherapy fills a very important role and can be used most everywhere more or less, depending upon weather conditions, we have in the carbon arc great facilities. The doctor laid particular stress on breathing of fresh, cool air, but I am afraid in Florida it would be rather depressing. It seems there might be an element of difficulty there that would be avoided in the Alps.

I think if these arthritis cases are treated with diathermy in connection with radiant light you will get far better results. I furthermore take exception to the fact that we are thinking of only ultra violet and infrared. I think the whole spectrum is of a great deal of importance. It plays its part in every feature and I believe that those who talk of using mercury vapor lamps and ignore the fact that light transmitted from that lamp includes all, except perhaps the orange and red, that we are getting the effects of all the radiations except the heat effects. Personally I believe that the heat effects are very important with the rays of the visible spectrum; as shown by Dr. Ring in his paper, with just the carbon incandescent lamp he derived the effects of the heat in the visible spectrum without the ultra violet. My own personal experience leads me to believe that if we do not study the whole field and know it as we should we are not doing real, scientific physical therapy. While Sir Henry Gauvain and Rollier have done some very brilliant work, as I can speak from experience as I have been instrumental in healing sinuses by ultraviolet combined with the visible rays, I am more and more impressed with the fact that these men are not giving full justice to a very important subject, neglecting to combine other important methods with their heliotherapy.

DR. GEORGE J. OTT (Boston, Mass.): It seems to me that Dr. Snow stressed a very important point when

he clearly points out that medicine, particularly that branch of medicine known as physical therapeutics, is not complete with any one element, any one measure or modality. We as physicians oftentimes think ourselves to be specialists and regard ourselves as dealing with some other thing. Of course in order to be intensive we have to think of one thing, but in order to be broadminded and get the best results, we must take the body as a whole, take the patient as a patient and we have to take our measures as a complete rounded, all-around means of cure. I am very glad Dr. Snow brought out those points and I think some of you gentlemen can emphasize them or give a further dissertation.

DR. MARY L. H. ARNOLD SNOW (New York City): I was pleased to listen to Dr. Watters' most interesting paper and in respect to the effect of the cold air and the use of Heliotherapy I would like to call attention to what Sir Henry Gauvain mentioned in one of his lectures while in this country, that is in the treatment of some of his tubercular patients, that is the little children, after having given them a heliotherapy treatment they were put on portable litters and dipped into the ocean so as to obtain the effect of the cold water. He considered this to be of great value. Now whether the effect may be attributed wholly to the use of the salt which is a very important factor according to Sajous relative to immunity or whether the effect may be attributed to a combination of the salt and the cold, here is a question which is yet to be answered.

In our experience we are very careful to make a selection of a particular source of artificial sunlight or of some of its rays to meet the demands of the case or the condition that is presented. In all of our convalescent cases we prefer the carbon arc lamp because it has a wider range of the visible rays of light. In addition to the use of the carbon arc lamp we use the air-cooled ultraviolet in order to secure more pronounced local effects and of course those treatments are very much shorter. Furthermore, we make a difference in the application of the air-cooled ultra violet in respect to its distance from the body and in this connection I would like to call attention to Dr. Kime's article on "Applied Bio-Chemistry" which will enable us to apply ultra violet rays and other rays more scientifically to meet the pathological conditions presented.

In the treatment of pulmonary tuberculosis we depend mainly on the use of the x ray but we also give all of those patients the carbon arc lamp and very short treatments at a distance of forty inches of the air-cooled ultra violet. In these cases we find that the



liver is very inactive and we use other modalities as for instance the static wave current over the liver for twenty minutes or if that is prohibited on account of cholecystitis or gall stones we use diathermy. Too much stress cannot be laid on the combination of modalities to meet all conditions to raise the personal index of these patients and also the technic and selection of the proper source of heliotherapy to meet conditions as presented.

DR. W. H. WATTERS (Closing): Concerning the question Dr. Feldman brings up of the danger of heliotherapy in pulmonary tuberculosis Rollier says he can in certain cases obtain satisfactory results. He, however, warns against that very carefully and I should say that would be particularly true with heliotherapy from the artificial forms. It can be used in certain cases. I think if we could accurately gauge the amount of tuberculin that is absorbed by a little extra exercise, a little radiotherapy or heliotherapy, we could treat these cases properly.

Concerning the question of heat in Florida if I get talking of Florida I will not keep within my time limits. I wish I could take you down to my clinic roof this winter from which I can see about 50 miles around. If you can stay out there practically any morning after you get accustomed to it without the accompaniment of the coverings that society requires, it would be very comfortable but the fact that Miami is down south does not mean it is hot. I grant there is hot weather there, but I have never seen a temperature of over 90 degrees. You have not the variation there

that you have in New England. You do not have the hot weather there that is attributed to Florida.

Dr. Snow brings up the question that there should be other things in addition to heliotherapy. Nobody would be more willing to accept that than I. Diathermy of course helps many cases. The person who is a dangerous person is one that will go out and claim he cures all things with one method. That is why the physician or properly trained person should supervise it.

Concerning the question of the carbuncle and heliotherapy I think there is a very adequate explanation for that. If the patient comes to you with a pain and you give him one-eighth of a grain of morphine, it will remove the pain. If we give him a grain of morphine, it may remove the patient. Personally I am not a great believer in the fact that we are getting benefit in heliotherapy, radiotherapy, ultra violet, etc., from the bactericidal effects of the rays, granted that they are bactericidal. My opinion is that we get our benefit by increasing resistance of the part, by taking fresh serum to the part, carrying the old serum away, increasing resistance, but we can decrease it just as much by overdoing it.

I was going to take up the question of the angstrom unit, etc., to show how much we get from ultra violet. Of course in sunlight we do not get as much ultra violet as in the artificial. An article came out this week showing how the radiation from 2000 A. U. up to 3000 A. U. has greater theoretical value in certain cases than does the higher.

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### **On the Indication for the Interruption of Pregnancy After Irradiation of the Gravid Uterus. F. Sachs, M. K., No. 31, 1927.**

Eugenic indications are considered as justification for the interruption of pregnancy after irradiation. This is indicated when the expected child will probably be badly injured. The information as to the life expectancy of children from an irradiated uterus during their early development is too meager to decide definitely such an important question. The literature yields sixteen cases with five injured children. Zappert, who collected the statistics, demands more and better observed material. The only definite conclusion arrived at from Zappert's work is that one must be very careful in the irradiation of pregnant women, particularly in the first two or three months. If irradiation of the uterus is done very early, the embryo is in most cases killed. In another group there is no injury at all, so that instead of interrupting pregnancy it is better to

let nature take its course. There must be more and better observation of children born after irradiation in order to be able to decide the question of the interruption of pregnancy after irradiation.

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### **Activation of Foods by Ultra Violet Irradiations, Without Injury to Taste. Fred Rohr and O. K. Schultz, *Klinische Wochenschrift*, No. 2, 1927.**

The authors have exposed food stuffs, particularly butter and cream, to ultra violet rays, and have thus succeeded in activating these foods. In the activation process the cholesterolin content plays the chief role. In order that no injury occur to the taste, the albumen must first be removed. The authors believe that they can obtain in this way an effective antirachitic butter fat preparation, with which, owing to its higher cholesterolin content, wonderful results can be obtained. Further experimentation is in progress.



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# EDITORIAL

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## ARCHIVES OF PHYSICAL THERAPY, X-RAY, RADIUM

DISRAELI KOBAK, M. D., Editor  
Suite 820—30 North Michigan Avenue,  
Chicago, Illinois.

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ALBERT F. TYLER, M. D., Managing Editor

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**Seventh Annual Meeting,  
Chicago, September, 1928**

### THE LAW OF ABSORPTION

Future historians of modern medicine no doubt will pause at the name of Theodor von Grothaus and expatiate at great length on the value of his contributions to science. It was he who first enunciated in 1819 the law that light must be absorbed in order to produce an effect although recognition of this valuable generalization did not come forth until Draper, at a later

date (1841), independently, confirmed it. The paradox of this belated recognition in explanation of the working effect of energy is probably due to the fact that Grothaus labored in a period when electro- and photo-dynamics was in its very infancy. Chaos and exaggeration surrounded the mysteries of medical electricity which was of great contemporary interest to the medical profession. The attention of physicians at that time was in a large measure divided between the work of Galvani and Volta and the polymys of their disciples. The explanations of Galvani and Volta regarding the origin of electricity in living tissues were diametrically opposite to each other. Galvani's premier of an endogenous nature of electricity differed from Volta's view of the exogenous source of the energy. This controversy was at its very height in the first quarter of the nineteenth century during which contemporary medicine was too closely involved to broadly differentiate the problem of electricity, its nature, and its effect.

A popular conception of the nature of electrothermy of that period was that it was some form of shock therapy. Aldini with his experiments on executed criminals hoped to influence the dead or at least to differentiate the dead from those in a state of suspended animation.

A select but brilliant group of investigators existed at this period. Their research interest centered not around the inexplicable phenomenon of electricity with its ability to stimulate muscles, but upon the nature of radiant energy and its effects. The beginning of the nineteenth century found Sir. William Herschel investigating the heating effect of the visible and invisible parts of the spectrum. Because of his researches we are now cognizant of an existing and invisible energy below the red part of the visible

spectrum, designated by him, "infra red radiation." The failure of Scheele to correlate the reduction effect of silver chloride with chemical nature of spectral radiation gave opportunity to Ritter and Walleston in 1801 to demonstrate the chemical effect of an invisible energy that existed beyond the violet region of the luminous spectrum, and at present designated as ultra violet. Thus, while energy of an invisible nature was proven to exist in the respective regions below and above Newton's spectrum, the action of this energy remained unrecognized until Grotthus enunciated the law of absorption:—"Only the rays absorbed are effective in producing chemical change." The importance of this law has become so widely recognized in physical therapy that it has been adopted as the first corollary to ultra violet radiation therapy. Without absorption of energy from either the sun, quartz or carbon lamps, cholestral, ergo-sterol and a host of other compounds remain inactive or chemically inert. The absorption and activation of cholesterol or some of its associated materials is followed by a production of vitamin "D" and this, in turn, is the specific for the cure of not only rickets and spasmophilia, but also certain other deficiency diseases.

Biophysicists and biochemists are today applying Grotthus' generalization to many branches of science. Physiologists have recognized its importance for many years. Without absorption of the energy in the materials of food or in drugs, no physiologic changes take place.

The keystone to biochemistry is in a very great measure dependent upon the verity of energy absorption. Oxidation reduction, and the influence upon the colloidal phase is in a broad sense proportional to the energy that is absorbed. The physiologic value of infra red generators, radiant lamps and even diathermy is in direct value to the energy absorbed, and less to the energy penetrated. Diathermy, whether it penetrates profoundly or superficially is of value physiologically, not because of the physical vis-a-

tergo-, voltage, but upon energy that is absorbed. That the heating effect of diathermy is due to the physical resistance to the current by the tissue is today becoming accepted as an explanation the garment of which is threadbare, and the excuse for which further wear is without scientific fact. The caloric and metabolic effect of diathermic current can thus be explained in terms of energy absorption, more rationally than upon tissue resistances. The universality of von Grotthus' generalization is apparent and it has no limitations where thermo- or photodynamics are utilized.

—D. K.

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### EUROPEAN TOUR AMERICAN COLLEGE OF PHYSICAL THERAPY

1928

*To Attend Lectures - Clinics - and  
Visit the Leading Centers of  
Physical Therapy*

Mindful of the great benefits to be derived from first hand contact with European leaders in our profession, *The American College of Physical Therapy* invites you to attend a series of lectures to be held at the leading centers of physical therapy abroad. You will note the itinerary has been very carefully planned to give ample time for clinics and lectures as well as an opportunity to visit principal points of interest in the various cities. While en route on the Atlantic liner a systemized course of lectures will be given on physical therapy by two leading teachers in this special work. There will be demonstrations and personal conferences in all branches of electro-physical therapy.

The steamships used are well known Cunard cabin boats offering every comfort at minimum rates, and only hotels of repute will be used. For those desiring to attend the Radiological Congress at Stockholm in July an extension tour can be arranged at very little additional cost.

Ladies are welcome, special provisions having been made for their diversion while the doctors attend the lectures and clinics.

The membership fee is \$977 from New York to New York, which includes all steamboat, railroad and motor car fares, hotel accommodations with table d'hôte meals; all sightseeing, as provided in the itinerary, and all tips to hotel staffs and baggagemen, except in England where tipping en masse is resented. A large suit case is presented to each member, which will be transported through the trip free of charge.

This is an unusual opportunity for the doctor to combine a pleasure trip with one that will give him a very intensive course in physical therapy, together with close observation of the work in this specialty that is being carried on by the pioneers of Europe. The instruction course which will be offered on the voyage en route will in itself give the doctor:

(1) An opportunity to acquaint himself with the fundamentals and practical experiences of recognized specialists. This means that it is not absolutely necessary for one previously to have had any experience with the use of physical agents.

(2) An intensive and thorough review course in every branch of electro-physical therapy as employed in all the various specialties of medicine and surgery.

The visits at the various hospitals and clinics in the prominent cities of Europe and the personal contact with the clinicians who have developed physical therapy will tend further to augment the preliminary instruction work. All in all, this combined and systematized method of offering such an intensive plan should indeed be an attraction to every physician. *The American College of Physical Therapy* is very glad to offer this means to its fellows and other physicians who are interested in physical therapeutics.

#### ITINERARY

May 26. Sail from New York.

- June 4. LONDON.
- June 5. St. Bartholomew's Hospital.
- June 6. Middlesex Hospital.
- June 7. London General Hospital.
- June 8. Lord Trelor Hospital.
- June 9. Leave 9 a. m. Arrive Paris 4 p. m.
- June 10. PARIS: Motor to Versailles.
- June 11. Sal Petre & American Hospitals.
- June 12. Prof. D'Arsonval's clinic.
- June 13. Dr. Riviere's clinic: Hotel Dieu.
- June 14. Guests of Soc. Electrotherapy and Radiology of France.
- June 15.
- June 16. Leave 8 a. m. Arrive Lausanne 5:20 p. m. Leave 8:25 p. m. Arrive Montreux 9:07 p. m.
- June 17. MONTREUX. Castle of Chillon.
- June 18. Motor to Leysin. Prof. Rolliere's clinic.
- June 19. Leave 11:05 a. m. Arrive Zurich 7:06 p. m.
- June 20. ZURICH. University of Zurich.
- June 21. Leave 8:24 a. m.
- June 22. VIENNA. Dr. Kowarchik's clinic.
- June 23. Allgemeine Krankenhaus.
- June 24. Potsdam.
- June 25. Kaiser Jubiläum Spital.
- June 26. Other clinics and hospitals.
- June 27. Leave 8 a. m. Arrive Berlin 10:27 p. m.
- June 28. BERLIN. Dr. Rudolf Verchow Krankenhaus.
- June 29. Dr. Nagelschmidt's clinic.
- June 30. Other clinics.
- July 1. Leave 8:20 a. m. Arrive Copenhagen 7:05 p. m.
- July 2. COPENHAGEN. Finsen Institute.
- July 3. Dr. Carl Sonne's Laboratory.
- July 4. Sail for New York.

Above tour subject to change at discretion of Director of Travel.

For further information address *The American College of Physical Therapy*, travel department, 25 Broadway, Suite 656, New York, N. Y.

### HOSPITAL CONGRESS

The thirteenth annual convention of the Catholic Hospital Association of the United States and Canada and the second annual Hospital Clinical Congress of North America will be held in the Cincinnati Music Hall, Cincinnati, Ohio, June 18 to 22, inclusive, 1928. The fourth annual convention of the International Guild of Nurses will be held at the same time, in the same building, at night meetings.

This convention and congress will be one

of the largest and most important hospital meetings of the year, and will comprise general scientific meetings, special clinics or demonstrations of hospital departments, and three hundred special commercial and educational exhibits. Outstanding authorities in medicine, surgery, pathology, nursing, dietetics and hospital administration, architecture and engineering will lecture and demonstrate in specially planned clinics representing the various departments of the modern hospital. A professional program of the highest interest and value is now being formulated and all persons interested in medical and hospital service are cordially invited to attend. Further information may be obtained from John R. Hughes, M. D., Dean of the College of Hospital Administration, Marquette University, Milwaukee, Wisconsin, who is general chairman of the convention and congress.

### Treatment of Pernicious Anemia with Liver Diet and Irradiated Ergosterin. G. Rosenow. *Klinische Wochenschrift*, Aug. 1927.

Remissions were secured in several patients with pernicious anemia by the use of the liver diet of Minot and Murphy (poor in fat, cooked liver, green vegetables and an abundance of fresh fruit). The addition of irradiated ergosterin seems to favor the occurrence of remissions.

### Experimental Contributions to the Study of the Antagonistic Effect of Irradiations of Different Wave Lengths. L. Armani. *La Radiol. Med.*, XIV, 2, Feb., 1927. *Abst. Fort. Auf dem Gebiete der Rontgenstrahlen*, XXXVI, No. 1, 1927.

The author has obtained the following results from his four series of experiments:

1. An antagonistic physical effect arises between roentgen rays and the rays emitted by a Sollux lamp. (Control with Holzkecht-Radiometer).
2. This antagonistic physical effect is also a biological one as is found in experiments with guinea pigs.
3. This effect can be used as a specific in the treatment of recent acute radio dermatitis.
4. Guinea pigs which were exposed to different weak single or combined irradiations showed no note-

worthy difference in growth.

According to the author we have here a new scientific field and can obtain good results with it in many diseases.

### Galvano-Radiotherapy in Facial Paralysis. *Bulletin Officiel de la Societe Francaise D'Electrotherapie et de Radiologie*, March, 1927.

According to the observations of Constantin, of Toulouse, the author combines galvanisation with radiotherapy. He employs the continuous current twice daily the first month (5 minutes in the morning, 5 minutes in the evening, 5 to 10 ma. some interruptions, at the end of the sessions after the third week), daily the second month (with a 10 minute duration.) For three patients application of one auriculo-mastoid fossa to the other, for two, technique of Bourguignon. Three of the patients have been submitted to four sittings of radiotherapy: localizer 6-8½ behind ear; filter 3 mm., 250 R. each time, a session every eight days.

The five cases seemed similar clinically and from the point of view of electrical reactions. The patients who have not been submitted to electrotherapy have been cured more slowly. Those who have been slightly improved by the galvanic treatment alone, have been considerably improved after the addition of the x rays.

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# THE STUDENT'S LIBRARY

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## BOOKS RECEIVED

This column is devoted to acknowledgment of the books received. Such acknowledgment must be regarded by the sender as sufficient recognition of the courtesy until time and space permit selections to be made for review.

**DISEASES OF THE EYE.** *Charles H. May, M. D.,* Director and Visiting Surgeon, Eye Service, Bellevue Hospital, New York 1916, to 1926; Consulting Ophthalmologist Mt. Sinai Hospital, French Hospital, and Italian Hospital, New York; Formerly Chief of Clinic and Instructor in Ophthalmology, College of Physicians, Medical Department, Columbia University, New York City. Twelfth Edition, Revised. With 374 Original Illustrations, including 23 plates with 73 colored figures. New York City, William Wood and Company, Publishers.

**RADIUM IN GYNECOLOGY.** By *John G. Clark, M. D.,* Former Prof. Gynecology, Univ. Penn., Gynecologist in Chief to the Univ. Hosp., and *Charles C. Norris, M. D.,* Prof. of Obstetrics and Gynecology, Univ. Penn., Gynecologist to the Radiologic Staff Philadelphia General Hospital; with a chapter on physics by *Gioacchino Failla, E. E., M. A., D. Sc.,* Physicist, Memorial Hospital, New York. Cloth. Pp. 315 with 49 illustrations. Philadelphia; J. B. Lippincott Co., 1927.

**DISEASES OF THE MOUTH.** By *Sterling V. Mead, D. D. S.,* Prof. Oral Surgery and Dis. of the Mouth, Georgetown Dental School; Prof. Dis. of the Mouth, Georgetown Medical School; Oral Surgeon to

Georgetown Hospital; Dental Surgeon to Providence Hospital; etc., etc. Second Edition, Cloth. Pp. 578 with 274 original illustrations in text and 31 full page color plate. St. Louis: C. V. Mosby Co., 1928.

**THE PREVENTION OF PREVENTABLE ORTHOPEDIC DEFECTS.** By *S. C. Woldenberg, B. Sc., M.D., M.Sc.,* Chicago. Attending Orthopedist Post Graduate Hospital and Michael Reese Dispensary, Chicago, formerly in charge of the Orthopedic Service, U. S. Veterans Hospital. With 109 Pp., 29 illustrations. St. Paul, Minn., Bruce Publishing Company.

**DIATHERMY WITH SPECIAL REFERENCE TO PNEUMONIA.** *Harry Eaton Stewart, M. D.,* Formerly Attending Specialist in Physiotherapy, U. S. Marine Hospitals, New York, N. Y.; Consultant in Physiotherapy, U. S. V. B. Hospital, New Haven, Conn.; Director, New Haven School of Physiotherapy; Formerly Asst. Director, Section of Physiotherapy, Office of the Surgeon General, U. S. Army, and Supervisor of Physiotherapy, Bureau of U. S. Public Health Service, Washington. With 45 Illustrations and 15 charts. Second Edition, Revised. New York City, Paul B. Hoeber, Inc., Publishers.

## BOOKS REVIEWED

**THE INTERNATIONAL MEDICAL ANNUAL. A YEAR BOOK OF TREATMENT AND PRACTITIONER'S INDEX.** Forty-fifth year. 560 Pp. New York. William Wood and Company. 1927.

The book commences with an introduction by the editors. Important new discussions are mentioned, of interest here, particularly those on radiotherapy, and physical therapeutics. An authoritative article on phototherapy is presented. The editors are indebted for this to Sir Henry Gauguin, and also to the publishers who sent an artist to Alton in order to secure an accurate representation of some of the more intricate appliances which are employed there. "The application

of these principles is working a revolution in hospital construction, and it may well be that this revolution will include and reshape the whole science and art of medicine."

"The tendency to use the simple forces of nature as therapeutic agents, is perhaps a little obscured by the analytical habits of the human mind. We are not content to know that sunlight and fresh air are helpful in the struggle against disease; we want to know how and why they are helpful. So far as the therapeutic effects of light are concerned, this inquisitive instinct will find much to satisfy it in the article to which the editors have alluded."



As has been the custom in the past the subjects are arranged in dictionary style. Many contributors have collaborated in the discussions. The name of each contributor follows the topic at the beginning of each discussion. The illustrations, colored occasionally, are well selected and made and help towards the completeness of the volume.

**DISORDERS OF THE NOSE, THROAT AND EAR—PROBLEMS OF DEAFNESS.** By *Aaron Roth*, M. D., F.A.C.S., Attending Ear, Nose and Throat Surgeon, Jewish Hospital, Brooklyn; Assistant Chief of Staff, Ear, Nose and Throat Department, Brownsville, E. N. Y. Hospital. With original illustrations by the author. Brooklyn. New York. Physicians and Surgeons Book Company. 1927.

This little book was "designed for the laymen and the educator who, for one reason or another may be interested" in ear, nose and throat diseases, but "should be profitable also to the medical student as auxiliary reading and to nurses and general assistants associated with the specialty of otolaryngology."

The style is simple, the avoidance of highly technical terms and explanations being manifest throughout the volume. Most of the work would tend to convey a message of personal touch from the author. This phase is strengthened by the sketches which are used for illustrations and which are from the pen of the author.

While the reviewer appreciates the fact that in a small book too much space cannot be given over for the discussion of certain subjects, yet the brevity of some chapters is especially noteworthy. It might be said also that the discussion of some subjects of lesser importance is too full.

The attempt to introduce in the treatment here and there some physical therapeutic methods cannot be commented on very favorably inasmuch as the technic suggested is not in accord with accepted practice.

Chapters XXII to XXIV inclusive, covering in all about thirty pages, on such a vital problem as deafness, are much too meager and brief and fail to bring out important facts of interest to the classes for whom the book is intended. In all, however, there is much to be gained in the way of information and for ready reference, and while, here and there, as already mentioned, fault can be found with some of the technical methods, in general the text is reasonably authoritative. There is a place for a little volume such as this in any library.

**OPHTHALMOSCOPY, RETINOSCOPY AND REFRACTION.** By *W. A. Fisher*, M. D., F.A.C.S., Pro-

fessor of Ophthalmology, Chicago Eye, Ear, Nose and Throat College, etc. Second revised and enlarged edition, with 260 illustrations, including 48 colored plates. 291 Pp. Philadelphia. F. A. Davis Company, 1927.

Probably the most striking virtues of this text are the style in which it is written and the large number of colored and black and white illustrations. The discussions are easy to understand, well spaced and printed in good size type which makes the reading enjoyable. Indirect and direct ophthalmology are stressed particularly because of its necessity in making a correct diagnosis. Chapter IX considers the subject of glaucoma while Chapter X goes into the optical principles, test type, lenses, refraction and cycloplegics. Then follow chapters on applied refraction, astigmatism, presbyopia, heterophoria. Chapters XVI and XVII cover retinoscopy, Chapter XVII, measurement of lenses, prescription writing, transportation and frame fitting. Chapter XVIII goes into the newer methods of refinement in ophthalmic diagnosis and was written by Dr. Robert Von Der Heydt of Chicago. The value of the slit lamp in ophthalmology is particularly stressed and this treatise should aid students to master the use of this newer aid in diagnosis.

While there are a great many books on the market dealing with ophthalmoscopy, retinoscopy and refraction, this one is distinctive in the arrangement of its material and no doubt has a definite place in the training of students and practitioners in ophthalmology.

**HISTORY OF THE INCANDESCENT LAMP.** By *John W. Howell* and *Henry Schroeder*. 208 Pp. Schenectady, New York. The Maqua Company, 1927.

As the introduction truthfully states, the incandescent electric lamp as made and patented by Mr. Edison, is the foundation stone upon which the great electric light and power industry of today has been built. The rapid but steady development of this industry is more remarkable than what the average individual is able to realize. Step by step, progress was made. The tracing and recording of this progress in sequence make up the subject matter of this brochure. It is well written and extremely interesting. Those of us who today have taken to the use of incandescent lamps for therapeutic purposes can best appreciate a chronological presentation such as this and can best understand the expansion of utilization which these lamps now enjoy.

**DISEASES OF THE NOSE AND THROAT**, Comprising Affections of the Trachea and Oesophagus. A Textbook for Students and Practitioners. By *Sir St. Clair Thomson*, M. D., F. R. C. P., London; F. R. C. S., Enland; Consulting Surgeon for Diseases of the Throat

and Emeritus professor of Laryngology in King's College Hospital, etc., etc. Third edition, with 12 Color and 12 black and white plates and 379 figures in the text. Cloth. Pp. 944. New York: D Appleton and Company, 1927.

This is a comprehensive treatise of the subject. Several new sections have been written on Malignant Granuloma of the Nose, Dental and Dentigerous Cysts, Hairy and Dermoid Polypi of the Naso-pharynx, Chondritis Fibrinosa, and Keratosis (Leucoplakia) Laryngis. There are also new chapters on the esophagus. In general, the material has been brought pretty well down to date and newer techniques and procedures have been substituted for those which have fallen into disrepute on account of modern improvements. The illustrations, too, have been markedly improved upon.

An excellent feature are the footnotes, each one directing to a reference which supports some statement made by the author. This plan serves a double purpose, first that of confirmation, and second that of further investigational instructions for those who wish it. A large bibliography is thus provided and this is always pleasing and advantageous to the student who plans more extensive research on some special subject.

There are some chapters, however, which are somewhat meager in information. The ones including such borderline subjects as hay fever and asthma might well have been expanded, but as the author states in his preface, "Had space permitted I would have desired to enter into greater detail and to do more credit to the researches and results of the numerous colleagues, at home and abroad, with whom it has been my great pleasure to be associated during the last thirty-three years." Other chapters are, however, quite full and complete and the book altogether serves as a splendid text for both the student and practitioner.

The section devoted to diathermy is especially noteworthy, although the value of medical diathermy in otolaryngology is not discussed. The surgical aspects of this subject are, however, treated in more detail than in many of the more recent text books on nose and throat diseases.

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**LESSONS ON MASSAGE.** *Margaret D. Palmer.* Revised and the Massage Section Rewritten by *Dorothy Wood*, M. R. C. S., L. R. C. P. Cloth. Price \$4.00. Pp. 320. New York, William Wood and Company.

This is the sixth edition of this little volume which made its first appearance more than twenty-five years ago. Owing to the changes and advances in massage methods since the war, in order to bring the book into line with present-day teaching it was necessary to rewrite the whole of that part which deals with massage treatment.

Several chapters dealing with bandaging, Swedish gymnastics and gymnastic exercises have been omitted, because in the opinion of the present author who has undertaken the revision, they no longer meet modern requirements.

There are twenty-one chapters in all, an appendix and an index. The systematic division of the subject is commendable and makes for easy reference. The illustrations although few in number are well selected.

With the progress in physical therapy in general and recognition of the merits of massage in a variety of conditions, a book such as this is of distinct advantage to the student. It is written in a simple style, understandable, yet comprehensive for practitioners who are interested in this branch of therapy. While here and there, statements are made which would need more support of personal clinical experience, these claims seem to be justified on the basis of the years of experience of the authors. On the whole, the reviewer is of the opinion that this volume represents the present-day beliefs on massage, although overenthusiasm in the selection of this one therapeutic agent to the exclusion of others. Massage unquestionably is of value as an adjunct treatment measure.

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**PRACTICAL INDEX TO ELECTROTHERAPY.** *Joseph E. G. Waddington*, M. D. C. M., Second edition.

This book is clearly written and amply illustrated showing actual technique as well as discussing the theory of various subjects covered. Various chapters deal with galvanism, induced currents of low voltage, high frequency currents, static electricity, radiant heat, ultra violet and ozone.

The book closes with an index of diseases and selective techniques.

The author's style is clear, his reasoning logical, and the presentation clear. The student and the practitioner will find this book a handy reference and a source of valuable information.

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**BRONCHOSCOPY AND ESOPHAGOSCOPY.** By *Chevalier Jackson*, M. D., Professor of Bronchoscopy, Jefferson Medical College; Professor of Bronchoscopy and Esophagoscopy, Graduate School of Medicine, University of Pennsylvania. Second Edition, reset. Price \$8.50. Octavo of 457 pages with 179 illustrations and 10 color plates. Philadelphia: W. B. Saunders Co., 1927.

No greater tribute has been made to modern medicine than the development of the art and science of bronchoscopy and esophagoscopy by Dr. Chevalier Jackson. No greater monograph has advanced medical literature than the handwork of the master. For anyone to attempt to evaluate or pass judgment on such

a work would be preposterous. Only an outline of the wealth of material included will be given.

After a detailed chapter on the instruments used for peroral endoscopy, the essential anatomical points in the bronchoscopic tree are emphasized. The preparation of the patient, the anesthetic used and the position of the patient on the table for peroral endoscopy illustrate the detail to which the author turns in clarifying each step in his technic. Direct laryngoscopy is always indicated both for diagnosis and safeguarding the patient in the introduction of the bronchoscope. In acquiring skill, the cadaver rubber-tubed maniken and dog are suggested. Foreign body, benign and malignant neoplasms, and various diseases of the bronchial tree and esophagus are considered in subsequent chapters. The discussion and outline of the steps to take in a tracheotomy are illustrative of the careful detailed genius of the writer. Then, as corroborative evidence of the statements contained therein, but especially impressive of the authoritativeness of the text itself, the author has included a complete bibliography.

Invaluable to the practitioner of bronchoscopy and esophagoscopy, this text should furthermore occupy a conspicuous place on the monographic shelf of every well-read practitioner of modern medicine.

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**X RAYS AND RADIUM IN THE TREATMENT OF DISEASES OF THE SKIN.** By George M. MacKee, M. D., Prof and Director of the Dept. of Dermatology and Syphilology, New York Post-Graduate Medical School and Hospital; Member British Ass'n. Dermatology and Syphilology, Society of Dermatology and Syphilology of Germany, American Dermatological Society, etc. Second edition revised. Price \$10.00. Cloth. Pp. 788 with 354 engravings and 31 charts. Philadelphia; Lea & Febiger, 1927.

The name of MacKee has become inseparably linked both with the field of roentgenology and dermatology. His numerous invaluable contributions to current literature and the development of the indirect method of computing dosage applicable to any interrupterless transformer exemplify the continuous study and effort being daily expended by the writer to further the advancement of his profession.

Since the contribution of this text to medical literature in 1921, it has been considered one of the authoritative texts in its particular field. Thoroughly revised, including the latest proven developments in its specialty it should retain the enviable reputation established.

Reviewing the historical landmarks in the development of the art and science of roentgenotherapy and

radioactive elements, he presents the necessary physical principles determining its applicability and use. Various types of apparatus are discussed and the methods propounded for computation of dosage. Individually the pathological skin conditions to which radioactive substances are applicable are detailed. The complete bibliographies which follow each chapter impress the reviewer with the thoroughness and scientific accuracy of the author. Containing the necessary detail for the specialist in radiotherapy, the material has been so arranged and presented as to be of immediate use as a text for the student, or reference for the practitioner.

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**MINOR SURGERY.** By Arthur E. Hertzler, M.D., F. A. C. S., Chief Surgeon, Halstead Hospital and Victor E. Chesky, A. B., M. D., F. A. C. S., Chief Resident Surgeon, Halstead Hospital. Cloth., Price \$10.00. Pp. 568 with 438 illustrations. C. V. Mosby Co., St. Louis, 1927.

A new volume by an old writer. Dr. Hertzler has been an ardent contributor to modern medicine. His extensive researches in diseases of the peritoneum have been of tremendous assistance to the development of the great problem, peritoneal absorption, culminating in the two volume work by the same publishers in 1919. About the same time *Principles of Abdominal Surgery* was offered to the profession. The treatise on *Local Anesthesia* was revised in 1925.

A thorough scholar and an inspiring instructor, he again evaluates the problems confronting his pupils in surgery, seeking an aid to the dispensary student with his out-patient problems. Clarifying the many questions of sutures, suture material, dressings and bandaging by numerous illustrations and short, snappy discussions, he passes on to a discussion of the types of wounds, the problem of hemorrhage and blood transfusion. A general discussion of inflammation and infections precedes an anatomical classification of the various pathological conditions. For example, consider the classification of diseases of the abdominal wall: Tumors, cutaneous, lipomas, bald-headed sarcomas, desmoids; Hernias, umbilical, linea alba, inguinal, and femoral. Similar consideration is given all other sections. Of the individual conditions, after an introductory summary, the diagnosis and treatment are outlined.

Particular attention should be called to the simple, clear and easily obtainable contents of the text. The arrangement is self-evident, the bold face type headings classify the material and the wonderful illustrations complete a text worthy of the medical students' consideration.

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# INTERNATIONAL ABSTRACTS

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## **Action of Roentgen Rays on Nitrogen and Sodium Chloride Metabolism. Anna Jugenburg. *Strahlentherapie*, Bd. 25, Hft. 2, 1927.**

Guinea pigs were used in the experiments. The animals were kept in special cages adapted for the examination of the feces and urine. The dose given varied between one-half and one-tenth of the erythematous dose. The highly penetrating rays were filtered by 0.5 mm. zinc plus 3 mm. aluminum. The animals irradiated with one-half the erythematous dose showed a decrease of 25 per cent in the nitrogen content of the blood. At the same time there was a considerable retention of nitrogen in the tissues and organs of the body. Maximum retention occurred in the liver.

The elimination of chloride of sodium followed a process opposite to that observed for nitrogen. Elimination of sodium chloride is increased after irradiation and this increase is accompanied by a decrease of sodium chloride in the tissues.

## **Diathermy in the Treatment of Certain Circulatory Affections. Morel-Kahn. *Journal Medical Francais*, April, 1927.**

Diathermy is an excellent treatment of various circulatory affections because of its analgesic and antispasmodic effect and its action on the blood and lymph circulation. The special fields for diathermy where it has proven its value, are local circulatory diseases.

Intermittent claudication is a notable example where diathermy is indicated. Applied early, when the circulation is still present to an appreciable degree, diathermy produces an improvement which consists principally in the disappearance of pain and cold. By virtue of these effects, diathermy has a favorable action on Raynaud's disease and other types of gangrene.

## **Diathermy in Ophthalmology. A. Monbrun and M. Casteran. *Le Journal Medical Francais*, p. 136, April, 1927.**

The author finds medical diathermy of great value in those ophthalmologic affections where other therapeutic measures have been useless. Surgical diathermy is being developed in the treatment of tumors and chronic pathologic processes of the eyelids, orbit and external membranes. The advantages of diathermy reside in its simplicity, rapidity of application, uselessness of dressings and invisible scars.

## **Accidents in the Application of Diathermy. A. Laquerrière. *Le Journal Medical Francais*, April, 1927.**

Slight superficial burns, which, as a rule, are not serious, can be avoided by a good technician who is properly taking care of his patient during the sitting and is attending to all his complaints.

Rarely a coagulation en masse may be produced. This occurs when the circulation of the blood is defective or where too great heat is produced.

The author cites cases in which accidents have occurred, but concludes that in general diathermy is not dangerous.

## **Energy Measurements of Roentgen Rays. W. Rump, *Zschr. F. Physik*, No. 43, 1927.**

A physical energy measurement is only possible when the combined irradiation is completely absorbed and transformed into heat. The author has constructed a calorimeter in which the roentgen rays enter through an opening in a hollow space, which is surrounded by thick leaden walls. The increase in temperature of the leaden coat is measured by the increase in volume of a contact fluid. The rays are generated with a pressure of 43-14 k-v; filtering amounts to about 2 mm. of copper. It is found that the total energy rises with the square of the pressure. The use effect was found at 150 k-v. and anticathode at 1.6% of the cathode ray energy; it is therefore considerably higher than that accepted until now. The energy necessary to give rise to a pair of ions in the air was found to be 33 volts for strongly filtered hard roentgen rays. It is probably, in the investigated field, from 0.43 to 0.12 A. units, constant.

## **On the Treatment of Iris Tuberculosis With Roentgen Rays. H. Martenstein and A. Richter, *Klinische Monatsblätter Für Augenheilkunde*, No. 78, May, 1927.**

Roentgenotherapy has been applied only in recent years in iris tuberculosis. (Scheerer 1922 and 1925.) The fear of harmful effects is removed with careful dosage and filtering. The lens is especially resistant to the effects of roentgen irradiation. The authors treated with roentgen rays, 40 cases, some with ancient, some with recent iris tuberculosis. The results were very fav-



orable, especially in the recent cases. (Among 10 cases 9 were successful, i. e. absence of excitability and clearness of the bulb.) Twenty-four hours after irradiation, an early reaction sets in, which in most cases disappears after the following twenty-four hours. The eye then begins to lose color, exudate formation ceases, precipitates disappear, and tubercles are resorbed. Older cases require higher combined doses than recent one and the effect is not so certain. In five cases there were lens injuries, in two others corneal degenerations. All could not be brought into a single relation to the irradiation, because old cases were dealt with. It is important to notice that after four to six weeks a late reaction sets in which may go along with injection and precipitate formation; further irradiation should not be applied in this case. A tuberculin cure should be instituted instead, since the roentgen rays have only a local effect.

**Desensitization of Patients with Bronchial Asthma by Diathermy of the Spleen. R. Gassul. Wratschebnoje delo Sept. 7, 1926. Abst. Fort. Auf Dem. Geb. Der Ront. 36, No. 4, 1927.**

Allergy is established in asthma when the corresponding anaphylactogenous substances are introduced intracutaneously. This allergy is in close relation with the constitution and the endocrine system of the patient. Bronchial asthma is considered as a syndrome of heightened sensitivity of the respiratory apparatus toward various irritating substances. Thus the therapeutic method in the treatment of the asthmatic patient is limited. If the anaphylactogen is known it is sufficient to remove the same from the body and surroundings of the patient. If this is not possible, the patient must actively be desensitized. This is done by cutaneous injection of the anaphylactogen. Even this is not always successful because: (1) anaphylactogen cannot always be determined; (2) numerous patients are polyvalent, that is are hypersensitive towards various substances. From these difficulties arose the effort to find a method whereby the general productin of antibodies can be increased. The spleen is the universal place for formation of the antigens. This function is increased by inducing an active hyperemia of the spleen. Starting from these premises, the author suggested diathermy of the spleen, whereby an active hyperemia of the same is produced, and thereby an increase in its function.

The author considers this method entirely harmless and successful even in cases where other methods, notably roentgen irradiation, have failed. The author has been successful in a number of his cases, several of his patients still being free from their attacks a year after treatment.

**Treatment of Delay in Walking by Ultra Violet Rays. Mouriquand and Bernheim. Lyon Medical, Oct. 31, 1926.**

Ultra violet light acts on muscular hypotonicity which is one of the most constant manifestations of rickets. The tonicity of the muscles is greatly increased with the very first treatments. They become firmer and show an increase in volume. Walking becomes possible in a very short time. A maximum of three series of ten sessions each is sufficient.

**Observations on the Changes Produced by Some Forms of Physical Therapy. N. Messerle. Schweiz. Med. Wschr., No. 28, July 9, 1927.**

Physiotherapeutic methods are irritation methods. Primary and secondary effects are combined and summed up into irritation effects. Optimum relations among the organs are re-established. This transformation is effected by irritations repeated many time. The vegetative nervous system forms the point of attack of physical therapy. The vegetative nervous system has for its function the regulation of organ correlation. Heat processes augment the parasympathetic tonus. Cold processes raise the sympathetic tonus. In the present state of the question, in view of the functions of both antagonists of the vegetative nervous system, one may suppose that the sick organs are governed by a lasting preponderance of the sympathetic tonus or of the parasympathetic tonus. The goal of our treatment then, is the restoration of equilibrium in the vegetative nervous system.

The mental state should not be neglected in physical therapy, since the mutual influence of the mind and the vegetative nervous system is an established fact.

There is no basic difference between the effects and methods of physiotherapy and pharmacotherapy. Physical agents generate in the human body physical, chemical, ionic and colloidal changes. These act just as pharmaceutical agents do according to their strength affinity for the tissues of the organ, etc.

**Action of Diathermy in Poliomyelitis. Paul Duhem. Le Journal Medical Francais, April, 1927.**

The heat produced by diathermy is endogenous. Its action is exerted against the superficial trophic vascular affections as well as the deep affections of the muscles, vessels and bones. In the organs traversed by the lines of force of the current, the effect of diathermy is maximum. With the employment of diathermy cyanosis and contractures of the extremities disappear, and the patient can carry all the necessary orthopedic apparatus without difficulty. Everything which is



curable is cured under the best of possible conditions.

**Technique:** As soon as the febrile period is over, applications of diathermy may be begun. For the upper limb one electrode is placed in the dorsal region, the other in the form of a sleeve around the forearm or the arm, or the hand on the plate. For the lower limb the indifferent plate is placed in the dorso-lumbar region, the active electrode around the leg; the foot can also be placed on the plate. Each affected limb must be treated separately. The current must be passed through very carefully. The patient must be closely watched during the application, observing the skin, particularly towards the edge of the electrodes, in order to avoid the serious burns of which several cases are reported. Children cry from any cause and observing them is difficult. The author himself has never had any serious accident in the numerous applications he has made.

#### **Diathermy in Abdominal Affections. Le Journal Medical Francais, April, 1927.**

Diathermy has yielded favorable results in the following diseases:

(a) In five cases of algias—one cure, one considerable improvement, two improvements.

(b) Forty-seven cases of perivisceritis, epiploitis, adhesions, etc.—14 cures, 9 considerable improvements, 7 slight improvements, 7 improvements, 10, no results.

(c) Diseases of the gall-bladder—5 cases resolved themselves thus: 1 cure, 3 improvements, 1 no result.

(d) Five cases of very serious gastric trouble have yielded only one improvement.

(e) Having had only four cases of obstinate constipation no comparison can be made between diathermy and other electrical methods studied in the literature since 1902.

(f) Four cases of colitis—1 cure, 2 marked improvements, 1 improvement. Here, too, the cases are too few.

(g) Three cases of chronic salpingitis have all resulted in success.

In conclusion: It is regrettable that diathermy is not utilized as much in France as it is in other countries.

#### **Diathermo-therapy in Gynecology. W. Vignal. Le Journal Medical Francais, April, 1927, Pp. 138-142.**

(a) Affections of the uterus—Uterine hypoplasia. A large vaginal electrode is connected to one of the poles; two other electrodes, one on the abdomen, the other at the lumbo-sacral region, are connected to the other pole. The intensity is 1500 to 3000 ma. with a duration of thirty to forty-five minutes. Treatment is begun immediately after the end of the menses and

lasts until the following period. The author gives the following results: Enlargement of the uterine cavity; normal menses; sterilities of nine to eleven years duration were cured.

**Metritis and endometritis:** Diathermic treatment, if correctly and regularly applied, is the treatment par excellence. Even hemorrhagic metritis is cured.

**Mucous polyps:** The polyps which project to the exterior of the cervix can be removed by diathermo-coagulation. If the polyp is not pedunculated, a needle is implanted there and the current is passed until it becomes white (several seconds).

**Cancer of the cervix:** The diathermic amputation of the cervix is more of a surgical operation than an electrotherapeutic application. Diathermy can be used as an adjuvant treatment of curietherapy and radiotherapy of malignant neoplasms of the uterus.

(b) Disorders of menstruation—Amenorrhea. An electrode 20x15 is placed on the abdomen and another on the loins. The duration is 30 to 45 minutes. The applications are between menstrual periods. Dysmenorrhea is treated in the same way; but since this condition is combined with a disorder of the endocrine glands, general diathermy should be practised.

(c) Diseases of the tubes: **Treatment of salpingitis** by diathermy is still very much discussed and there is a great division of opinion.

(d) Affections of the vulva and the vagina are very rapidly destroyed by diathermo-coagulation. Diathermy is one of the best methods of treating vulvovaginitis of the woman and the small girl; for the woman the treatment of uterine hypoplasia is employed; for the small girl, in order not to injure the hymen, a metallic urethral electrode is carefully introduced into the vagina.

Diathermy coagulation is applied with success in vulvar hyperesthesia, vaginismus, neuralgias, clitoritis, ovarian and pelvic neuralgias.

#### **Diabetic Gangrene Cured by Diathermy. Deherm and De Brancas, Journal de Radiologie et D'Electrologie, XI, No. 1, 1927.**

The patient, 77 years old, had an attack of pain in the right foot, at the end of Nov., 1924. She had been a diabetic for 25 years. At the time of examination patient suffered enormously; her foot was swollen, the third toe, completely black, was the seat at its superior extremity, (phalango-metatarsal joint), of a sero-hemorrhagic oozing; on the external edge of the foot there was a small violet colored plaque; there was also a gangrenous plaque in the median part of the plantar surface, in the region of the forepart of the foot. The general condition was also bad with a great quantity of sugar in the urine.

An energetic treatment with insulin was instituted, and the first application of diathermy was made Dec. 24. At this time there was no pulsation of the tibial artery. Three weeks later the pulsation reappeared. The same treatment was continued; the toe dropped off about two months after the beginning of the treatment, and through the gap thus opened were eliminated the debris of the gangrenous tissue. The swelling reached the ankle; antigangrenous serums were used as local dressings.

The sugar having virtually disappeared from the urine, the insulin dose was correspondingly decreased. Little by little the appearance of the foot changed. The painful crises finally disappeared, the gangrenous plaque which was at the external edge of the foot sloughed off without leaving any trace; the patient felt better and was allowed to go about on crutches.

At this time the improvement progressed rapidly, the ankle again took on its normal form, and the gangrenous plaque sloughed off leaving an absolutely healthy skin. The foot, all white without edema, presented only one orifice about 1 cm. in diameter through which some small debris still oozed. At this time the patient was considered cured; she walked around on crutches and passed entire days on a chair on the porch.

Treatment had lasted six months; during this time the patient had a diathermy treatment almost every other day. Each sitting lasted thirty-five to forty-five minutes with an intensity of 6 to 700 milliamperes. Very remarkable, according to the author, is the re-appearance of the tibial pulsation, the entire absence of which had been established by the attending and consulting physician.

**Presentation of a Case of Chronic Anterior Poliomyelitis (Progressive Muscular Atrophy) Treated Years Ago by Radio-diathermotherapy. H. Bordier, *Journal de Radiologie et D'Electrologie*, XI, 4, 1927.**

The patient, suffering from chronic anterior poliomyelitis, was first submitted to radiodiathermotherapy in November, 1911. He enjoys good health at the present time. This case has been reported in the author's book: *Diathermy and diathermytherapy*, p. 511, of the third section.

When the patient was first seen in November, 1911, all the muscles of the hands, of the forearms, of the arms and shoulders, had undergone progressive atrophy. The atrophy having begun in the hands proceeded from below upwards. The last muscles attacked were the deltoids and the infra and supra spinatus. The atrophy had begun one and one-half years before. There was a marked hypothermy of all the atrophied regions, particularly the hands. Radiotherapy was applied immediate-

ly. The irradiations were made obliquely, to the right and the left of the cervical cord, in a series of three sittings a month; there were thus six series. Diathermy was applied by means of a moistened spongy cylinder on all the atrophied parts from the hands to the shoulders. After 15 sittings, heat was re-established in the hands and arms. This heat was maintained. The hands in particular remained warm even in winter. However, several treatments were given from time to time.

After the first series of radiotherapy, there was a noticeable improvement. First, the atrophic process was arrested, the muscular masses of the shoulders became manifestly larger. The circumference of the deltoids increased several centimeters. Movements at the same time improved.

**The Present State of the Irradiation Question in the Treatment of Cervix Carcinoma. W. Furst. *Archiv fur Gynakologie*, No. 130 Heft 2, July, 1927.**

Radiation treatment represents a necessary adjunct for the treatment of cervix carcinoma. It is questionable whether we will ever arrive at a combined radium and roentgen treatment. Since irradiation must be accepted as the best palliative treatment, and since radiation sensibility, as yet, can almost never be estimated with certainty, all inoperable carcinomas are to be transferred to a special clinic which has a radiation department. The author claims and supports his claims with many cases from his material, that completely inoperable tumors, if they are sensitive to radiation, can be cured. The method of preradiation with roentgen rays is indicated in every form of carcinoma treatment.

**Ocular Accidents of Actinotherapy and Their Prophylaxis. Toulant, *Journal de Radiologie et D'Electrologie*. Vol. XI, No. 4, April, 1927.**

Ocular accidents in the course of actinotherapy are fortunately rare, thanks to the precautions which are taken. But the author has found a certain number of instances in his own personal researches, both clinical and experimental, which he has recently made on the action of ultra violet light in ophthalmology.

Infra red rays are responsible for cataracts; the visible rays, although they play no role in the lesions of the cornea and the crystalline lens, cause photo-traumatic lesions of the retina; the ultra violet rays are responsible for the greatest number of ocular accidents in industry and actinotherapy. They cause actinic keratitis.

In general actinotherapy, it is necessary to protect the eyes against the ultra violet as well as the infra red rays. It is first of all necessary to interpose an

opaque screen between the source of light and the eyes of the patient. It is best to protect the face by a thick black veil suspended vertically above the neck. The eyes are also protected against diffuse light by Fieuzal glasses No. 6-8.

In local actinotherapy the visible rays can be avoided by contracting the pupil through the instillation of pilocarpine. The infra red rays which are the most dangerous, should be arrested as completely as possible by the interposition of a quartz vessel filled with a solution of copper acetate 5-100. If it is necessary to prolong the irradiations, it is well to manipulate the vessel in such a manner as to be able to obtain a circulation of water to prevent heating the solution.

Prophylaxis is very important in these accidents. The lamp should be masked by an absolutely opaque reflector. The physician should wear dark colored glasses furnished with apoque frames, preferably metal. Treatment for ocular accidents is given.

#### **Electro-Radiotherapy in Diseases of the Prostate. W. Vignal, *Le Journal Medical Francaise*, XVI, No. 1, 1927.**

Prostatitis: High frequency and high pressure currents have a vaso-motor and inhibitory effect on sensory nerves. High frequency currents are applied either monopolar or bipolar. The author prefers the latter method. A metallic electrode, connected to the upper pole of the Oudin Resonator, is introduced into the rectum. The other end of the resonator is connected to a plate placed on the abdomen close to the pubis.

After several sittings, (5 to 7), pain completely disappears. Diathermy acts by the endogenous heat it develops within the tissues, and calls forth an intensive vaso-dilation. High frequency currents, themselves, or through their derivative effects, acts on micro-organisms, particularly gonococci. A Hegar bougie No. 18, is introduced into the anus and connected to one of the extremities of a small solenoid, an abdominal plate being connected to the other. Daily sittings are held of fifteen to twenty minutes each, with 500 to 800 ma. During the very first session painful symptoms disappear, the prostate clears up. In the subacute and chronic prostatitis, roentgenotherapy can be employed, according to technique given below.

Hypertrophy of the prostate: Electrolysis of the prostate across the rectum gives no results. Galvanisation was advised but there were equally no results. High frequency under the form of pressure or diathermy acts only on congestive symptoms and the periprostatitis in the beginning. The best physiotherapy of prostatic hypertrophy is roentgenotherapy. "X rays act as selective agents of cellular destruction." (Regaud.)

The author reviews the various French and foreign papers which appeared on this question.

The route of choice seems to be the perineal, to which one may add, in certain cases, the suprapubic route. The author treated his cases with a pressure of 150 kilovolts, an intensity of 3 ma., filtered by 7 mm. of aluminum. Doses: 600 to 800 R or 3 to 4 units H per weekly session. Position: knee chest. The ampulla is centered with a localizer of 10 cm. diameter, on the raphe between the anus and the root of the scrotum.

The immediate and remote results are considered.

Currietherapy can equally be employed, but a difficulty in dosage arises.

Cancer of the prostate: Currietherapy permits the local, exact and direct application. In certain cases the action of radium can be supplemented by deep radiotherapy. (200 kilovolts pressure). Vignal reviews the various methods of applying radium in cancer of the prostate. The method of inserting radium after total prostatectomy gives the best results.

#### **Action of the Sun on Potassium of Living Organisms. J. Risler and Foveau de Courmelles, *Journal de Radiologie et D'Electrologie*, XI, 4, 1927.**

Potassium is found in living organisms, particularly in blood cells. The effect of potassium on organic functions is not due to its chemical properties but to the radio-active properties of that metal. A smaller amount of radio-active energy than is necessary during winter, being sufficient during summer to maintain functional automatism of the hearts of lower animals, has caused the author to ascribe this to the action of the sun during summer. To determine whether its radio-active constant will be raised, the author exposed to the sun potassium chlorate placed on sensitive plates. From these experiments the first conclusion reached is that the sun has an unquestionable effect on the micro-radio-activity of potassium. (On the 48th day of exposure two of the plates showed a definite impression.) Another conclusion is that one of the principal effects of the sun, or of rays of greatest wave length, on the living organism, can at last be determined in a very exact way. The sun, in effect, irradiates the element potassium which is found in the blood. The light of the sun increases the number of particles emitted by the element potassium; these particles call forth the ionization of neighboring atomic systems, changing their mass, lowering the heats of formation, and in one word, accelerating vital phenomena, thus raising the general state, and increasing the consumption of oxygen.

**Ultra Violet Light in Whooping Cough. Bru Camille, Journal de Radiologie et D'Electrologie, XI, 4, 1927.**

The author had remarkable success with ultra violet light in whooping cough.

**Technique:** The method employed does not differ from other methods commonly used. The children were completely undressed, their heads covered and their eyes protected. The irradiation was aimed at the chest, the distance of the burner being 70 cm. The first session consisted of a two minute irradiation on the anterior surface of the chest and a two minute irradiation on the posterior surface. In the following sittings, held every two days, there was an increase of two to three minutes each time. If the erythema was very pronounced, the time of irradiation was reduced. Two lamps of the common type were used.

The results with this treatment were very satisfactory. Whenever the children presented from the beginning a pronounced erythema, they improved rapidly and were cured. The conclusions are based on statistics of 33 patients:

(a) In three the disease was checked.

(b) In three there was partial success corresponding to a definite and marked improvement.

(c) There were twenty-seven cures.

The proportion of checks is therefore about 10%, that of improvements about 10%, that of cures about 80%.

**Localizers for Local Actinotherapy. Pierre Porcher, Journal de Radiologie et D'Electrologie, XI, No. 6, 1927.**

Author presents a series of localizers of melted silica, which can be adapted to all the lamps in use, and which answers a very urgent need. A localizer must be a good conductor of ultra violet, a poor conductor of heat, (the absorption of infra red reduced to a minimum,) and should be easily adapted to all existing apparatus. Melted silica has the following advantages: its transparency in the visible spectrum is three times as great as the clearest glass (crystal); under a thickness of one meter the latter transmits 35% of incident light whereas melted silica under the same thickness transmits 92%. The most transparent glass arrests all rays below 3000 A. (within ultra violet); silica has no noteworthy absorbability up to 2300 A. as Joos has indicated, silica still manifests a transparency up to 1930 A. All these properties find their application in the localizers for multiple reflection described by the author. If the extremity A, of a cylinder of silica, is strongly irradiated by a source of ultra violet, there will follow a series of total reflections of the radiation in the interior of the cylinder, and the beam emerges through the extremity B of the cylinder,

regardless of the shape into which the cylindrical body had been cast. One thus possesses a means of conducting a beam of ultra violet into a place which is inaccessible to direct radiation. The quantity of ultra violet energy emerging through the largest localizer, despite the multiple reflection, is about 80%. In order to arrest all of the infra red rays, a small cube of silica with parallel surfaces and containing a slight thickness of water, is interposed between the base of the localizer and the source. This cube is placed behind an intermediary to which is attached a small wheel permitting a freedom of orienting the localizer and at the same time a certain gliding movement from before backward. The lamp which is fixed, is thus rendered independent of the localizer, which is submitted to all possible movements of the patient.

Various forms of localizers are pictured. The vaginal localizer has a conical staircase shaped end and can be introduced into osteomyelitic cavities or into the rectum. Two are particularly suitable for fistulous tracts, and one cylinder of small diameter is especially adapted for the urethra or the external auditory canal. Finally a large localizer is designed for use in boils and anthrax.

**An Experimental Study of Diathermy. I. The Measurement of Lung Temperature. Carl A. L. Binger, M. D. and Ronald V. Christie, M. B., Ch. B. (From the Hospital of The Rockefeller Institute of Medical Research) J. of Exp. Med., Oct., 1927.**

These investigators were led to a study of the bodily response to high frequency currents as a preliminary to an investigation of the value of diathermy in pneumonia. They studied the nature of the so-called diathermy current and then experimented on the effect of diathermy current on the rectal temperature. A table shows the effect of diathermy current on deep temperature. A cure shows the effect of death on heat recorded by thermometer placed in abdomen between electrodes. The technique for measuring temperature is given.

The summary and conclusions are:

1. Experimental evidence is furnished to show that in normal animals the rectal temperature can be elevated by the passage of high frequency currents.

2. During life the intra-abdominal and intrathoracic temperatures can be increased only slightly above the rectal temperature.

3. The lung temperature in the anesthetized dog normally lies 0.3-0.4°C. below the rectal temperature. During the passage of diathermy currents of strengths equivalent to those used in therapy this relationship is reversed—the lung temperature exceeding the rectal temperature by about the same value.



4. Immediately after death, the temperature rises abruptly in the deep tissues between the electrodes.

5. For the measurement of deep temperature special thermocouples have been devised. Their method of preparation and more of use are described.

**An Experimental Study of Diathermy. II The Conditions Necessary for the Production of Local Heat in the Lungs.** Carl A. L. Binger, M. D., and Ronald V. Christie, M. B. Ch. B., *J. of Exp. Med.*, Oct., 1927.

Experimental work by Binger and Christie in the second of a series of investigations on diathermy led to the following summary and conclusions:

1. Prevention of the access of air to one lung, while its circulation is intact, results in little if any, change in the rate of heating of the lung by the diathermy current.

2. Occlusion of a main branch of the pulmonary artery during the flow of the current results in a sudden rise in temperature in the lung whose artery has been occluded, with subsequent heating, however, at the original rate under these circumstances death of the animal is accompanied by a precipitous rise in the temperature of both lungs.

3. When the pulmonary veins as well as the artery to one lung are ligated the circulation through the bronchial vessels is also stopped. Diathermy then results in a local rise in temperature in the lung equivalent to that seen in the other lung after death.

**An Experimental Study of Diathermy. III The Temperature of the Circulating Blood.** Carl A. L. Binger, M. D., and Ronald V. Christie, M. D. Ch. B., *J. of Exp. Med.*, Oct., 1927.

The authors have convinced themselves that the normal lung can be heated only slightly above the systemic temperature by the application of high frequency currents to a dog's thorax. "Interference with the circulation of blood to the lung, however, either by clamping one of the main branches of the pulmonary artery, or by ligation of all the root vessels, provides the conditions necessary for local deep heating. The implication that the circulating blood serves to carry away the heat produced in the lung seems obvious. Such an interpretation is in harmony with the physiology of heat distribution and temperature regulation. It is probable that together with its many other equilibrating functions the blood is a fairly ideal medium for distribution and maintenance of a uniform temperature.

This experimental study considered the temperature of arterial and venous blood alone and during diathermy.

In their discussion, the authors state: "The facts presented in this paper must be regarded as further evidence of the effective cooling of the lung during diathermy by the blood circulating through it. It can be estimated roughly, assuming a minute volume of blood flow through the lungs of 2.50 liters, and a rise of 0.2°C. in arterial blood temperature above venous, that approximately half of a large calorie of heat is being removed from the lungs per minute. This is evidently sufficient to prevent any marked degree of local heating."

**Effect of Therapeutic Doses of Ultra Violet Radiation on Basal Metabolism in Children,** Margaret E. Fries, M. D., *Am. J. of Dis. Child.*, Aug., 1927.

It has been assumed that there is a rise in basal metabolism following ultra violet irradiations. In treating patients with ultra violet radiations, it is of great importance to the physician to know what effect may be expected from such exposures. While several effects are known, the author inquires: "Can any of these changes be ascribed to the supposed change in basal metabolism?"

This was the problem that formed the basis for this research. The work was divided into two parts: The first, to determine whether there was any rise in basal metabolism following therapeutic doses of ultra violet radiation over a long period of time; the second, to discover whether there was an immediate rise in the metabolism following lack of successive treatment. These experiments were performed on children in whom there was moderate malnutrition or who were suffering from some minor ailment, and who were willing to remain in the hospital for this period. Proper controls were employed. The tables show the records of the cases.

Summarizing the results, the author writes:

1. Three children in the hospital and two in the outpatient department were treated with ultra violet radiations three times a week.

2. Determinations of basal metabolism were made from twenty to seventy hours following treatment.

3. The basal metabolic determinations did not vary more than 10%, except in the second series of treatment in an ambulatory case. As not all conditions could be controlled in the ambulatory cases, the decline that occurred in this case cannot be attributed solely to the ultra violet radiations.

It is quite evident from these experiments that ultra violet radiations did not cause any change in basal me-



tabolism except in one child. It seems justifiable to assume that a series of treatments with ultra violet radiations will not affect the basal metabolism of the majority of children.

**Experiences of Deep X Ray Treatment of One Hundred and Eighty Cases Which Were Chiefly Malignant, Professor Maurice R. J. Hayes, F. R. C. S. I., Brit. J. Radiol., Aug., 1927.**

The author distinguishes between "Deep X Ray" and Erlanger treatment and calls attention to the fact that these are not synonymous terms. The Erlanger technique has been tried in various countries, but so far the excellent results which have been obtained at the source do not appear to have been reproduced elsewhere. Carcinoma is discussed with special reference to its location. Graves disease is also considered.

As conclusions of his study, Hayes states:

1. One of the chief problems in radiotherapy is to discover the radio-sensitivity of abnormal cells and to determine standards of dosage and the best way to administer them.
2. A review of the recent literature shows that the repeated administration of fractional doses of highly penetrating x rays is more generally favoured in the treatment of carcinoma than the massive dose technique.
3. While irradiation controls the function of many secretory glands, and inhibits or destroys the growth of many forms of neoplastic tissue, it is evident that our present methods have not reached finality; and it is not less important to consider the host than the disease in our endeavor to solve the cancer problem.

**Effect of Therapeutic Doses of Ultra Violet Radiation on Basal Metabolism in Children, Second Paper: Immediate Effect, Margaret E. Fries, M. D., and Topper, M. D., Am. J. Dis. Child., Aug., 1927.**

To determine whether there might be an immediate effect on basal metabolism following ultra violet radiation, five children were studied in the wards of the pediatric service of the Mount Sinai Hospital from December, 1925 to June, 1926. The fact that the ultra violet rays from the sun were fairly potent during the latter months of this study did not in any way interfere with the experiment, as the immediate effect of the rays was of interest.

Six tables give the results. Five children in all were treated three times a week, the length of exposure being gradually increased from three minutes to fifteen minutes. Basal metabolic readings were recorded preceding and immediately following irradiations, and again, one,

two, and six hours later. It was interesting to note that the reading preceding and following irradiation usually did not vary more than 10%. In all cases in which the increase was greater than 10%, there was a disturbing environmental factor, which, in itself, could have explained the increase. The blood pressure and the pulse rate remained practically constant throughout.

Thus the conclusion: "Therapeutic doses of ultra violet radiation did not cause any appreciable change in the blood pressure or pulse rate of these children either immediately after treatment or one, two or six hours later. In all probability, therefore, it can be assumed that there will not be any change in basal metabolism, pulse rate or blood pressure in the majority of children following therapeutic doses of ultra violet light."

**The After-Treatment of Fractures About the Elbow. K. G. Hansson, M. D., and R. G. Birrell, B. A. M. B., Am. J. Surg., Aug., 1927.**

These writers discuss the anatomy of the elbow joint, stressing those facts which are related to their subject of investigation. They divide the after-treatment into several stages. Heat as a therapeutic agent is considered with reference to its physiologic effects. The various means of conductive and convulsive heat are described. Diathermy is referred to as the convulsive form. Three techniques of applying it to the elbow are given. The benefits of massage and therapeutic exercises are also discussed.

The conclusions of this investigation are of interest and are cited as follows:

The immobilization of fractures about the elbow, carried on more than one month, is responsible for longer after-treatment and, usually, incomplete return of function. The question of when to start the after-treatment, therefore, comes up, and we have tried to answer this, by using the physiological bone repair as a criterion. This should suggest the end of the second week after the time of reduction, as a safe time for the beginning of the after-treatment.

It is further believed that:

1. Massage and passive motion of the elbow are contra-indicated, because they are unphysiological and may produce myositis ossificans or, at least, excessive callus.
2. Early application of heat and active motion to the injured part promotes early functional restoration.
3. The after-treatment should not be entrusted to technicians without supervision. It should include physical means, the physiological action of which is well understood and well conducive to nature's way of healing and restoration.

4. Any treatment by physical means that may require one hour out of every twenty-four or forty-eight hours is insufficient and of little avail, if it is not followed up by some home exercises, which can be repeated every two or three hours.

5. In spite of best efforts at reduction as well as after-treatment, about 10 per cent of the fractures about the elbow will show poor end-results.

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